2.2 Safety and Physical Hazards and Mitigation

Industrial safety and physical hazards will be encountered while performing project operations. Section 4.2 provides general safe-work practices that must be followed at all times. This section describes specific industrial safety hazards and procedures to be followed to eliminate or minimize safety and physical hazards that will be encountered by project personnel.

2.2.1 Material Handling and Back Strain

Material handling and maneuvering of various pieces of equipment, drums, end effector stands, and waste in the PGS during project operations may result in employee injury. Mechanical lifting devices such as hoists and forklifts will be used wherever possible to eliminate the need for manual materials handling and lifting. Where these devices are not feasible, lifting and material-handling tasks will be performed in accordance with MCP-2692, "Ergonomic Program." Personnel will not physically lift objects weighing more than 50 lb or 33% of their body weight (whichever is less) alone.

The IH will conduct ergonomic evaluations of various project operations to determine the potential ergonomic hazards presented by various material handling and equipment use operations. Following this evaluation, the IH will provide recommendations to mitigate these hazards including additional engineering controls or work practices. Applicable requirements from MCP-2739, "Material Handling, Storage, and Disposal," also will be followed.

2.2.2 Repetitive Motion and Musculoskeletal Disorders

Project operational tasks such as material handling and glovebox operations may expose personnel to repetitive-motion hazards, undue physical stress, overexertion, awkward postures, or other ergonomic risk factors that may lead to musculoskeletal disorders. Musculoskeletal disorders can cause a number of conditions including pain, numbness, tingling, stiff joints, difficulty moving, muscle loss, and sometimes paralysis. The assigned project industrial hygienist will evaluate project tasks and provide recommendations to reduce the potential for musculoskeletal disorders in accordance with MCP-2692.

2.2.3 Working and Walking Surfaces

Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. Project operations inside the WMF-671 WES will present potential tripping or slip hazards from uneven flooring surfaces, equipment cords, pit surface during manual excavation (probes), wet surfaces or floor obstructions. Outside the WMF-671 WES the potential for slip, trip, and fall hazards will increase during winter months because of ice- and snow-covered surfaces. All personnel will be made aware of tripping hazards that cannot be eliminated by marking them (e.g., probes). All operations personnel will wear required protective footwear with adequate traction sole to further mitigate slip and fall potential. Tripping and slip hazards will be evaluated during the course of the project in accordance with PRD-5103, "Walking and Working Surfaces."

2.2.4 Proper Housekeeping to Prevent Slips, Trips, and Falls

The floor of every WMF-671 WES, RCS, and PGS area shall be maintained, so far as possible, in a clean and dry condition. All walking and working surfaces will be kept clean, orderly, and free of foreign objects to prevent possible slip, trip, and fall hazards. Proper drainage and use of dry standing stations will be provided where wet processes (e.g., decontamination) are used that could cause a potential slip and fall hazard. All tools and equipment used during each shift will be placed back in the designated storage location unless required to be left in place. Cords and lines will be routed around walkways, stairs,

and entrances and exits to eliminate tripping hazards. Elevated walkways and platforms will be kept clear of potential tripping hazards at all times.

2.2.5 Elevated Work Areas

Personnel performing maintenance tasks or other operations may be required to work on elevated equipment or at heights above 6 ft. Personnel required to access the RCS area around the pit excavation (with an unprotected side or edge [trench box] which is 6 ft or more above a lower level) shall be protected from falling by the use of guardrail systems, personal fall-arrest systems or fall restraint system (travel restriction system) that prevents personnel from approaching the fall hazard in accordance with PRD-5096, "Fall Protection."

Although not anticipated, leading edge work in areas that will not allow for traditional fall protection controls will require a fall protection plan to be prepared in accordance with PRD-5096. Additionally, the following MCP requirements will be followed as they relate to project operations associated with elevated work:

- MCP-2709, "Aerial Lifts and Elevating Work Platforms"
- PRD-5067, "Ladders"
- PRD-5098, "Scaffolding."

2.2.6 Means of Egress

Established means of egress (continuous and unobstructed way of travel to an exit, exit access, and exit discharge) shall be maintained within all WMF-671 WES and RCS areas in accordance with NFPA 101 (2000), "Life Safety Code," requirements. This includes emergency lighting, illumination of signs, and marking of means of egress. A functional test of emergency lighting shall be conducted on every required emergency lighting system at 30-day intervals for not less than 30 seconds. An annual test shall be conducted on every required battery-powered emergency lighting system for not less than 1-1/2 hours (unless the system meets the exception under the Section 7.9.3 of the "Life Safety Code"). Equipment shall be fully operational for the duration of the test. Written records of the visual inspections and tests shall be maintained.

2.2.7 Powered Equipment and Tools

Powered equipment and tools will be used during project operations for material handling and glovebox operations. Use of this equipment presents potential physical hazards (e.g., pinch points, electrical hazards, flying debris, struck-by, and caught-between) to personnel operating them. All portable equipment and tools will be properly maintained and used by qualified individuals and in accordance with the manufacturer's specifications. At no time will safety guards be removed. Requirements from PRD-5101, "Portable Equipment and Handheld Power Tools," will be followed for all work performed with powered equipment including hand tools. All tools will be inspected by the user before use.

2.2.8 Electrical Hazards and Energized Systems

Electrical equipment and tools, as well as maintenance of project facility electrical systems, may pose shock or electrocution hazards to personnel. Ground-fault protected electrical circuits and receptacles in combination with safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. All electrical work will be reviewed

and completed under the appropriate work controls (e.g., TPRs or work orders). Before conducting electrical work, hazardous energy of the affected system will be brought to a zero energy state through the use of isolation methods in accordance with the following:

- MCP-3650, "Chapter IX Level I Lockouts and Tagouts"
- MCP-3651, "Chapter IX Level II Lockouts and Tagouts"
- Applicable facility supplemental procedures for the system or component being worked.

If work on energized systems is necessary, these practices will conform to the requirements in PRD-5099, "Electrical Safety," and Parts I through III of the NFPA 70E (2000), "Electrical Safety Requirements for Employee Work Places." Additionally, all electrical and other utilities will be identified before conducting surface penetration maintenance activities in accordance with PRD-22, "Excavation and Surface Penetrations."

2.2.9 Operational Fire Hazards and Prevention

The *Fire Hazards Analysis for the OU 7-10 Glovebox Excavator Method Project* (Gosswiller 2002) and the hazards analysis identify the fire hazards as fire involving the following:

- Contents of the excavation pit
- Retrieval equipment
- Materials in the PGS
- Combustible materials in the WMF-671 WES exterior to the RCS and PGS, and fire involving packaged waste materials during transport.

From the inventory discussion in Section 2, approximately 21% of the waste material in the excavation area is considered combustible. Nitration reaction and mixtures with free-flammable or combustible liquids may have increased the flammability of the combustible materials. Combustible liquids (mainly oils in both damaged and intact containers) are expected. Pyrophoric metals in the form of plutonium oxide or hydrated plutonium oxide are present in small quantities in the retrieval area. These could be fire initiators. There is no indication that other pyrophoric metals such as zirconium turnings are in the excavation area. Hydrogen generation, because of the radiolysis of waste zone materials, is expected in staged and stored containers of waste; however, because of the deteriorated condition of waste containers in the retrieval area and venting of drums, the risk of an explosion from retrieved containers is very low (Gosswiller 2002).

Firewater distribution for the project is provided through a connection to the existing RWMC firewater distribution system. The project dry-pipe, deluge, and fire department hose systems interface with the RWMC firewater distribution system at the Fire Riser Building. Because of excavation restrictions at the SDA, the firewater delivery system from the Fire Riser Building to the suppression systems is aboveground and is maintained dry to ensure the system will not freeze during cold weather.

Project objectives identified by DOE Order 420.1A, "Facility Safety," are met by the Project Fire Hazards Analysis (Gosswiller 2002). Review and approval of an equivalency request by DOE-ID also found that the fire protection strategy adequately satisfies the fire protection objectives of DOE Order 420.1A, and that it has been demonstrated that an equivalent level of fire protection to that

specified in NFPA 801 (1998), "Standard for Fire Protection for Facilities Handling Radioactive Material," has been provided (see Footnote B).

2.2.10 Flammable and Combustible Materials Hazards

Fuel will be required for the excavator and other equipment during project operations. Flammable hazards include transfer and storage of flammable or combustible liquids in the project operations area. Portable fire extinguishers with a minimum rating of 10A or 60BC shall be strategically located at the facility to combat Class ABC fires. Portable fire extinguishers will be located in all active project operations areas, on or near all facility equipment that has exhaust heat sources, and on or near all equipment capable of generating ignition or having the potential to spark. When storing project chemicals, MCP-2707, "Compatible Chemical Storage," will be consulted. The requirements of MCP-584, "Flammable and Combustible Liquid Storage and Handling," will be followed at all times.

2.2.10.1 Combustible Materials. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. The assigned fire protection engineer should be contacted if questions arise about potential ignition sources. The accumulation of combustible materials will be strictly controlled in all project operational areas including the surrounding project and support trailers area. Class A combustibles (e.g., trash, cardboard, rags, wood, and plastic) will be properly disposed of in appropriate waste containers. The fire protection engineer also may conduct periodic site inspections to ensure all fire protection requirements are being met.

2.2.10.2 Flammable and Combustible Liquids. Fuel used at the project for fueling the excavator and generator(s) must be safely stored, handled, and used. Only portable containers approved by Factory Mutual and Underwriters Laboratories (labeled with the contents) will be used to store flammable liquids. All fuel containers will be stored at least 50 ft from any facilities and ignition sources, stored inside an approved flammable storage cabinet or tank meeting the requirement s of NFPA 30 (1998), "Flammable and Combustible Liquids Code." Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions before being refueled to minimize the potential for a fuel fire.

2.2.10.3 Welding, Cutting, or Grinding. Personnel conducting welding, cutting, or grinding tasks may be exposed to molten metal, slag, and flying debris. Additionally, a fire potential exists if combustible materials are not cleared from the work area. Requirements from PRD-5110, "Welding, Cutting, and Other Hot Work," will be followed whenever these types of activities are conducted. This includes the requirement for a hot work permit (documented on a safe work permit) and designation of a fire watch.

2.2.11 Pressurized Systems

Pressurized plant and breathing air systems will be operated in support of project operations. The hazards presented to personnel, equipment, facilities or the environment because of inadequately designed or improperly operated pressure systems (vessels) include blast effects, shrapnel, fluid jets, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, or compressed-gas systems. The applicable requirements in PRD-5, "Boilers and Unfired Pressure Vessels," must be followed as well as the manufacturer's operating and maintenance instructions. This includes inspection, maintenance, and testing of systems and components in accordance with applicable American National Standards Institute (ANSI) requirements.

All pressure systems will be operated within the designed operating pressure range, which is typically 10 to 20% less than the maximum allowable working pressure. Additionally, all hoses, fittings,

lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure (generally the relief set point). The project safety professional should be consulted about any questions of pressure systems in use at the project site.

2.2.12 Cryogenics

Cryogenics may be used in support of project operations for cooling of detectors or other applications. If required, all cryogenic tasks will be conducted and protective equipment worn in accordance with PRD-5038, "Cryogenic Liquids." Personal protective equipment will be worn at all times when handling, transferring, or dispensing cryogenic liquids in accordance with PRD-5038. Additional hazards associated with cryogenic liquids include the following:

- **Pressure buildup:** Boiling of liquefied gases within a closed system increases pressure. Cryogenic liquids will not be contained in a closed system other than an approved Dewar. Cold fingers and similar devices have exploded when either an ice dam has formed within the apparatus or when users created a closed system by shutting off all of the valves.

- **Oxygen enrichment:** Liquid nitrogen may fractionally distill air, causing liquid oxygen to collect in the cryogenic container. Liquid oxygen increases the combustibility of many materials, creating potentially explosive conditions. Adequate venting will be provided when working with cryogenic liquids in a closed system or enclosed space.

- **Asphyxiation:** If vented into a closed space, a cryogenic liquid will vaporize, displacing oxygen and possibly causing asphyxia. Cryogenic liquid will not be stored in a closed space.

- **Embrittlement:** Cryogenic liquids will not be disposed of down any drains. Ordinary materials such as metal or PVC piping may not be able to withstand cryogenic temperatures. Cryogenic liquids will be allowed to evaporate in a well-ventilated area. Materials exposed to cryogenic temperatures for long periods or materials that have undergone periodic warming and freezing will be examined regularly for cracks and warping.

2.2.13 Compressed Gases

Compressed gases may be used in support of project operations. If used, all cylinders will be used, stored, handled, and labeled in accordance with PRD-5040, "Handling and Use of Compressed Gases." All transportation, handling, storage, and use of compressed-gas cylinders will be conducted in accordance with the Compressed Gas Association Pamphlet P-1-1965, "Safe Handling of Compressed Gases" (CGA 1965). Additionally, the assigned project safety professional should be consulted about any compressed gas cylinder storage, transport, and use issues.

2.2.14 Excavator, Equipment, and Vehicle Hazards

The excavator and forklifts will be used as part of the project operations. Hazards associated with the operation of the excavator and forklifts include injury to personnel (e.g., struck by and caught between hazards), equipment contact with the RCS, and property damage. All equipment will be operated in the manner in which it was intended and in accordance with the manufacturer's instructions or equipment design. Only authorized qualified personnel will be allowed to operate equipment. Personnel in proximity to operating equipment must maintain visual communication with the operator and stay out of the arm swing radius. Personnel also must comply with the applicable requirements of the following:

- MCP-2745, "Heavy Industrial Vehicles"

- PRD-5123, "Motor Vehicle Safety"
- DOE-STD-1090-01, Chapter 10, "Forklift Trucks."

Additional safe practices will include the following:

- All parked forklifts will have the forklift tines in the lowered position (resting on ground or floor).
- All heavy equipment and industrial vehicles will have backup alarms.
- Walking directly behind or to the side of equipment without the operator's knowledge is prohibited.
- While operating equipment in the work area, the equipment operator will maintain communication with a designated person who will be responsible for providing direct voice contact or approved standard hand signals. In addition, all facility personnel in the immediate work area will be made aware of the equipment operations.
- All equipment will be operated away from established traffic lanes and personnel access ways (whenever possible) and will be stored so as not to endanger personnel at any time.
- All unattended equipment will have appropriate reflectors or be barricaded if left on or next to roadways.
- All parked equipment will have the parking brake set and chocks will be used when equipment is parked on inclines.
- Personnel will be protected from the excavator swing radius when working inside the RCS. This may be accomplished by any or a combination of the following as determined appropriate by the safety professional and documented in work control. The swing radius area may be barricaded or marked to warn personnel, train personnel on the swing radius and the safe work practices required for the task and work location, or shutting down the excavator when personnel are working inside the swing radius area.

2.2.15 Excavation, Surface Penetrations, and Outages

No utilities or lines are buried in the project area to be excavated. Existing Type A and B probes will be hand excavated during overburden excavation. During waste removal, the Type A probes will be dislodged and set aside.

Excavation of the targeted project area will progress in the sequence specified in the *Excavation Plan and Sequential Process Narrative for the OU 7-10 Glovebox Excavator Method Project* (Jamison and Preussner 2002). The basic sequence will involve the following:

- Hand excavation around areas that will be hard to reach with the excavator (e.g., cluster of probes). A rough estimate of the manually excavated material is 120 ft^3 or about two soil sacks.
- The backhoe will remove overburden soils in two passes (depth of 2 ft followed by removal of the remaining overburden on the next pass) across the entire dig area, and removed overburden soil will be placed in soil sacks.

Waste excavation will proceed in stages with three discrete sections being excavated in sequence:

- Section 1 will excavate approximately one-half of the total pit volume and will core sample the underburden within this section
- Section 2 will remove the remaining balance of the waste zone material to be removed and will core sample the underburden within this section
- Section 3 will expose the underburden in proximity of the P9-20 probe for sampling.

All of the required underburden core sampling will be performed within these sections. A 52% angle of repose for the excavation will try to be maintained if the excavator is not capable of cutting vertical faces through the waste.

Modifications to the project structures in support of operations that will require surface penetrations. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented. All surface penetrations and related outages will be coordinated through the field supervisor and will require submittal of a Form 433.01, "Outage Request." The submission of an outage request will not be considered an approval to start the work.

All excavation and surface penetration activities will be conducted and monitored in accordance with PRD-22, "Excavation and Surface Penetrations," and 29 CFR 1926 9 (2002), Subpart P, "Excavations." Key elements from these requirements include the following:

- Daily inspections of excavations and protective systems (shoring box) will be made by a competent person (visual inspection from outside the RCS) for evidence of situations that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. Inspections also will be made following any hazard-increasing occurrence. These inspections are required only when employee exposure can be reasonably anticipated and will be documented on Form 440.31, "Daily Trench Safety Report," or equivalent.
- Designs of support systems, shield systems, and other protective systems shall be selected and constructed in accordance with the requirements set forth in 29 CFR 1926 (2002), Subpart P. The project shoring system and excavation method has been designed and approved by a professional engineer.
- When material or equipment used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot ensure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

2.2.16 Hoisting and Rigging of Equipment

A hoist system in the PGS will be use in support of project operation and maintenance tasks. All hoisting and rigging operations will be performed in accordance with MCP-6501, "Hoisting and Rigging Operations," MCP-6502, "Hoisting and Rigging Maintenance," MCP-6503, "Inspection and Testing of Hoisting and Rigging Equipment," MCP-6504, "Hoisting and Rigging Lift Determination and Lift Plan Preparation," MCP-6505, "Hoisting and Rigging Training," and DOE-STD-1090-01 as applicable for these project operations.

Hoisting and rigging equipment will show evidence of a current inspection (e.g., tag) and be inspected before use by designated operators. Additionally, if mobile crane or boom trucks are used in support of project operations, the operator or designated person for mobile cranes or boom trucks will perform a visual inspection each day or before use (if the crane has not been in regular service) of items such as, but not limited to, the following:

- All control mechanisms for maladjustment that would interfere with proper operation
- Crane hooks and latches for deformation, cracks, and wear
- Hydraulic systems for proper oil level
- Lines, tanks, valves, pumps, and other parts of air or hydraulic systems for leakage
- Hoist ropes for kinking, crushing, birdcaging, and corrosion
- All anti-two-block, two-block warning, and two-block damage prevention systems for proper operation.

Note: The operator or other designated person will examine deficiencies and determine whether they constitute a safety hazard. If deficiencies are found, they will be reported to the safety professional.

2.2.17 Overhead Hazards

Personnel may be exposed to overhead impact (contact) hazards during the course of the project operations from walking in, between, and around operational equipment and support structures in the WMF-671 WES, RCS, PGS, and storage buildings. Sources for these hazards will be identified and mitigated in accordance with PRD-5103, "Walking and Working Surfaces." In the case of overhead impact hazards, they will be marked by using engineering-controls protective systems where there is a potential for falling debris, in combination with head protection PPE.

2.2.18 Personal Protective Equipment

Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. In addition, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with PRD-5121, "Personal Protective Equipment," and MCP-432, "Radiological Personal Protective Equipment." All personnel who wear PPE will be trained in its use and limitations in accordance with PRD-5121 and 29 CFR 1910 (2002), Subpart I, "Personal Protective Equipment."

2.2.19 Decontamination

Decontamination of waste containers, powered equipment, tools, and WMF-671 WES, RCS, and PGS components will be required as part of project operations. Decontamination procedures for personnel and equipment are detailed in Section 11. Potential hazards to personnel conducting decontamination tasks include back strain; slip, trip, and fall hazards; and cross-contamination from contaminated surfaces. Additionally, electrical hazards may be present if water is used in areas with exposed electrical cords or receptacles. Mitigation of these walking working surfaces and electrical hazards are addressed in prior subsections. If a power washer or heated power washer is used, units will be operated in accordance with

manufacturer's operating instructions, personnel will wear appropriate PPE to prevent high-pressure spray injuries, use GFCI protection, and these tasks will only be conducted in approved areas. Personnel will wear required PPE at all times during decontamination tasks as listed in Section 5 and as listed on the associated JSA and RWP.

2.3 Environmental Hazards and Mitigation

Potential environmental hazards will present potential hazards to personnel during project operations. These hazards will be identified and mitigated to the extent possible. This section describes these environmental hazards and states what procedures and work practices will be followed to mitigate them.

2.3.1 Noise

Personnel performing project operations activities may be exposed to noise levels from the excavator trucks, hand tools, and compressors that exceed 85 decibel A-weighted (dBA). For an 8-hour time-weighted average (TWA), 83 dBA for 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear and pain and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Where noise levels are suspected of exceeding 80 dBA, noise measurements will be performed in accordance with MCP-2719, "Controlling and Monitoring Exposure to Noise," to determine if personnel are routinely exposed to noise levels in excess of the applicable TWA (85 dBA for 8 hours of exposure or lower TWA for 10- or 12-hour work-shift exposures).

Note: Exposures exceeding 8 hours per day will be evaluated by the assigned project IH.

Personnel whose noise exposure routinely meets or exceeds the allowable TWA will be enrolled in the INEEL Occupational Medical Program (OMP) (or subcontractor hearing conservation program as applicable). Personnel working on jobs that have noise exposures greater than 85 dBA will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the IH until directed otherwise. Hearing protection devices will be selected and worn in accordance with MCP-2719.

2.3.2 Heat and Cold Stress and Ultraviolet Light Hazards

Project operational tasks will be conducted during times when there is a potential for both heat and cold stress that could present a potential hazard to personnel. The assigned IH will be responsible for obtaining meteorological information to determine if additional heat or cold stress administrative controls are required. All operations personnel must understand the hazards associated with heat and cold stress and take preventive measures to minimize the effects. Management Control Procedure-2704 (2002), "Heat and Cold Stress," guidelines will be followed when determining work and rest schedules or when to halt work activities because of temperature extremes.

2.3.2.1 Heat Stress. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, to

unconsciousness, to death. In addition, operational tasks requiring the use of PPE or respiratory protection prevent the body from cooling. Personnel must inform their supervisor when experiencing any signs or symptoms of heat stress or observing a fellow employee experiencing such symptoms.

Heat stress stay times will be documented on the appropriate work control document(s), that is, an SWP, prejob briefing form RWMC Form 315, or other when personnel wear PPE that may increase heat body burden. These stay times will take into account the amount of time spent on a task, the nature of the work (i.e., light, moderate, or heavy), type of PPE worn, and ambient work temperatures. Table 2-6 lists heat stress signs and symptoms of exposure.

Individuals showing any of the symptoms of heat exhaustion listed in Table 2-6 shall do the following:

- Stop work
- Exit or be helped from the work area
- Remove and decontaminate PPE (as applicable)
- Move to sheltered area to rest
- Be provided cool drinking water
- Be monitored by a medic or employee certified in cardiopulmonary resuscitation (CPR) and first-aid.

Table 2-6. Heat stress signs and symptoms of exposure.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating.	Keep the skin clean, change all clothing daily, and cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps and exhaustion, sometimes with dizziness or periods of faintness.	Move the patient to a nearby cool place; give the patient half-strength electrolytic fluids; if cramps persist, or if signs that are more serious develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; cold, clammy skin; heavy perspiration; total body weakness; dizziness that sometimes leads to unconsciousness.	Move the patient to a nearby cool place, keep the patient at rest, give the patient half-strength electrolytic fluids, treat for shock, and seek medical attention. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.
Heat stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; dry, hot skin; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching.	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

Note: Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. The shift supervisor should immediately request an ambulance (777 or 526-1515) be dispatched from the Central Facilities Area (CFA) -1612 medical facility and the affected individual cooled as described in Table 2-6 based on the nature of the heat stress illness.

Monitoring for heat stress conditions shall be performed in accordance with MCP-2704. Depending on the ambient weather conditions, work conditions, type of PPE worn, and the physical response of work operations personnel, the IH shall inform the field supervisor or RCT of necessary adjustments to the work and rest cycle. Additionally, physiological monitoring may be conducted to determine if personnel are replenishing liquids fast enough. A supply of cool drinking water will be provided in designated eating areas and consumed only in these areas. Project personnel may periodically be interviewed by the IH, RCT, or safety professional to ensure that the controls are effective and that excessive heat exposure is not occurring. Workers will be encouraged to monitor personal body signs and to take breaks if symptoms of heat stress occur.

2.3.2.2 Low Temperatures and Cold Stress. For outdoor project-support operations, personnel will be exposed to low temperatures during fall and winter months or at other times of the year if relatively cool ambient temperatures combine with wet or windy conditions. The IH will be responsible for obtaining meteorological information to determine if additional cold stress administrative controls are required. Appendices B and C of MCP-2704 discuss the hazards and monitoring of cold stress. Table 2-7 provides the cold stress work and warm-up schedule if cold stress conditions exist (late fall, winter, early spring).

Additional cold weather hazards may exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure walking surfaces are kept clear of ice. The assigned project safety professional should be notified immediately if slip or fall hazards are identified at any project location.

2.3.2.3 Ultraviolet Light Exposure. Personnel will be exposed to ultraviolet light (UV) (i.e., sunlight) when conducting project operations outdoors. Sunlight is the main source of UV known to damage the skin and to cause skin cancer. The amount of UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. No UV rays or suntans are safe. The following are mitigative actions that should be taken to minimize UV exposure:

- Wear clothing to cover the skin (long pants [no shorts] and long-sleeve or short-sleeve shirt [no tank tops])
- Apply a sunscreen with a sun protection factor of at least 15 to areas exposed to the sun
- Wear a hat (hard hat where required)
- Wear UV-absorbing safety glasses
- Limit exposure during peak intensity hours of 10 a.m. to 4 p.m. whenever possible.

Table 2-7. Cold stress work and warm-up schedule.

Air Temperature °F (Approximate)	No Noticeable Wind		Wind 5 mph		Wind 10 mph		Wind 15 mph		Wind 20 mph	
	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks	Maximum Work Period	Number of Breaks
-15 to -19	Normal breaks	1	Normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4
-20 to -24	Normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5
-25 to -29	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5	Nonemergency work should cease	
-30 to -34	55 minutes	3	40 minutes	4	30 minutes	5	Nonemergency work should cease			
-35 to -39	40 minutes	4	30 minutes	5	Nonemergency work should cease					
-40 to -44	30 minutes	5	Nonemergency work should cease							
-45 and below	Nonemergency work should cease									

2.3.3 Confined Spaces

Entry inside the gloveboxes has been identified as a confined space entry in the OU 7-10 Project operations area. Work in confined spaces can subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. If confined spaces are identified at the OU 7-10 Project area, they will be evaluated in accordance with MCP-2749, "Confined Spaces," to determine if they are permit-required. If entry into identified project confined spaces is required, then all requirements of MCP-2749 will be followed.

2.3.4 Biological Hazards

The project facilities and support buildings and structures provide habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The potential exists for encountering nesting materials or other biological hazards and vectors. Hantavirus may be present in the nesting and fecal matter of deer mice. If such materials are disturbed, it can become airborne and create a potential inhalation pathway for the virus. Contact and improper removal of these materials may provide additional inhalation exposure risks.

If suspected rodent nesting or excrement material is encountered, the assigned IH will be notified immediately and **no attempt will be made to remove or to clean the area**. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with MCP-2750, "Preventing Hantavirus Infection."

Snakes, insects, and arachnids (e.g., spiders, ticks, and mosquitoes) also may be encountered at the project. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear, and contact the assigned IH for additional guidance as required.

Insect repellant (DEET or equivalent) may be required. Areas where standing water has accumulated (e.g., evaporation ponds) provide breeding grounds for mosquitoes and should be avoided. In cases where a large area of standing water is encountered, it may be necessary to pump the water out of the declivity (areas other than the established SDA ditches and silt basin).

2.3.5 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to persons or property at the project area (e.g., sustained strong winds 25 mph or greater, electrical storms, heavy precipitation, or extreme heat or cold) these conditions will be evaluated and a decision made by the IH, safety professional, RCT, and other operations personnel, as appropriate, to stop work, employ compensatory measures or proceed with operations. The shift supervisor and operations personnel shall comply with INEEL MCPs and facility work control documents and design requirements that specify limits for project operations.

During all project activities, assigned health and safety professionals in consultation with RadCon and the shift supervisor will determine if wind or other weather conditions pose unacceptable hazards to personnel or the environment.

2.4 Other Project Hazards

Project personnel should continually look for potential hazards and immediately inform the shift supervisor or other operations lead personnel of the hazards so that action can be taken to correct the condition. All personnel have the authority to initiate STOP WORK actions in accordance with MCP-553, "Stop Work Authority," if it is perceived that an imminent safety or health hazard exists or take corrective actions within the scope of the work control authorization documents to correct minor safety or health hazards and then inform the shift supervisor.

Personnel working at the project are responsible to use safe-work practices, report unsafe working conditions, near misses or acts, and exercise good housekeeping habits during project operations with respect to tools, equipment, and waste.

2.5 Site Inspections

The shift supervisor, IH, safety professional, RCT, and operations personnel may participate in project site inspections during the work control preparation stage of the project (e.g., the hazard identification and verification walkdowns), and conduct self-assessments or other inspections. Additionally, periodic safety inspections will be performed by the operations supervisors and assigned health and safety professionals in accordance with MCP-3449, "Safety and Health Inspections."

Targeted or required self-assessments will be performed during project operations in accordance with MCP-8, "Self-Assessment Process for Continuous Improvement," as directed by the operations manager or shift supervisor. All inspections and assessments will be documented and available for review by the shift supervisor, as a minimum. Health and safety professionals present during project operations may, at any time, recommend changes in work habits to the shift supervisor. However, all changes that may affect the facility written work control documents (e.g., HASP, JSAs, RWPs, SWPs, and work orders) must have concurrence from the appropriate operations technical discipline representative onsite and a Form 412.11, "Document Management Control Systems (DMCS) Document Action Request (DAR)," prepared for the applicable document as required.

3. EXPOSURE MONITORING AND SAMPLING

The potential for exposure to chemical, radiological, and physical hazards exists during OU 7-10 Glovebox Excavator Method Project operations and will affect all project operations personnel who are involved with operational waste handling, sorting, storage, transporting, and decontamination activities. Refinement of project operational area access requirements, work control zones (see Section 7), use of engineering and administrative controls, worker training, and wearing PPE provide the mitigation strategy for these hazards. Monitoring and sampling will be used throughout project operations to (1) assess the effectiveness of engineering controls, (2) determine the appropriate PPE requirements for individual tasks, and (3) determine the need for upgrading and downgrading of PPE as described in Section 5. Monitoring with direct-reading, stationary, and mobile instruments will be conducted to provide RadCon and Industrial Hygiene personnel with real-time and trending data to assess the effectiveness of control measures.

Tables provided in this section present the strategy for conducting exposure monitoring and sampling. These include:

- Table 3-1: Tasks and hazards to be monitored and monitoring instrument category
- Table 3-2: Monitoring instrument category and description
- Table 3-3: Action levels and associated responses for specific hazards.

3.1 Airborne Exposure Engineering Controls

Radiological engineering controls and isolation features designed for the WMF-671 WES, RCS, and PGS will serve as the primary defense to control both radiological and nonradiological hazards. Specifically, the ventilation system ensures that confinements are maintained during personnel or equipment accesses to the RCS and during an accidental breach of confinement contingency.

The project ventilation system design is a once-through system that ensures airflow is from the cleanest to the most contaminated confinement zones. The airflow is from the outside environment through the WMF-671 WES; from the WMF-671 WES through the PGS gloveboxes, drum loadout enclosures, and RCS; and then from the RCS through the exhaust filter bank and stack.

A primary fan and a manually activated backup fan are located outside the WMF-671 WES at the exhaust stack. Both fans are capable of drawing air from outside the WMF-671 WES through an inlet filter structure and damper in the ceiling of the WMF-671 WES. Air is then drawn through a series of inlet filters and dampers in the personnel monitoring and access rooms, RCS, PGS, drum loadout enclosures, and through the exhaust filter bank and stack. A fan in the transfer area draws air from outside the WMF-671 WES through a filtered inlet.

The exhausted air is monitored by a shrouded probe that meets ANSI and Health Physics Society standard ANSI/Health Physics Society N13.1-1999 (1999), "Sampling Airborne Radioactive Materials in Nuclear Facilities." The probe system consists of (1) lines from the stack for collecting real time and recording samples of conditions in the stack, (2) a climate-controlled cabinet for storing radiological samples, and (3) monitoring instrumentation. Real-time samples are analyzed by the system and returned to the stack. Record samples are retained for analysis.

Table 3-1. Tasks and hazards to be monitored and monitoring instrument category.

Tasks	Hazard(s) to be Monitored[a]	Instrument Category to be Used
Excavation Operations (RCS)		
• Overburden removal	Ionizing radiation—(alpha, beta, gamma, criticality)	1
• Waste retrieval	Radionuclide contamination—(alpha, beta, gamma)	2
• Underburden sampling • Sample handling and transportation	Chemical and nonradiological constituents, hazardous atmospheres	3, 4
	Respirable dust—silica and other particulates of concern	3, 5
	Hazardous noise	6
	Ergonomics, repetitive motion, lifting	7
	Heat and cold stress	8
Glovebox Operations (PGS)		
• Waste packaging • Waste sorting • Waste handling • Drum preparation • Drum loadout	Ionizing radiation—(alpha, beta, gamma, fissile material)	1
	Radionuclide contamination—(alpha, beta, gamma)	2
	Chemical and nonradiological constituents, hazardous atmospheres	3, 4
	Respirable dusts and other particulates of concern	3,4,5
	Hazardous noise	6
	Ergonomics, repetitive motion, lifting	7
General Project Operational Support Tasks		
• Drum handling • Forklift operations • Waste transportation and storage • Waste inspections • Drum assay	Ionizing radiation—(alpha, beta, gamma)	1
	Radionuclide contamination—(alpha, beta, gamma)	2
	Chemical constituents—organic vapors, lead	3, 4
	Respirable dust—silica (area and personal)	3, 5
	Hazardous noise	6
	Ergonomics, repetitive motion, lifting	7
	Heat and cold stress	8

Table 3-1. (continued).

Tasks	Hazard(s) to be Monitored[a]	Instrument Category to be Used
Maintenance of Project Systems		
• Electrical • Piping, valves, fittings, hoses • Communication • Heating, ventilating • Mechanical equipment	Ionizing radiation—(alpha, beta, gamma)	1
	Radionuclide contamination—(alpha, beta, gamma)	2
	Respirable dust—silica (area)	4, 5
Decontamination Tasks		
• Operational tools and equipment • RCS and PGS preliminary decontamination	Ionizing radiation—(alpha, beta, gamma)	1
	Radionuclide contamination—(alpha, beta, gamma)	2
	Respirable dust—silica (area and personal)	4, 5
	Hazardous noise	6
	Ergonomics, repetitive motion, lifting	7
	Heat and cold stress	8
Facility Lay-up		
• Backfill excavation	Radionuclide contamination—(alpha, beta, gamma)	2
• Fix removable contamination	Chemical constituents—organic vapors, lead, cadmium	3, 4
• Final decontamination on RCS and PGS • Secure Waste Management Facility-671 Weather Enclosure Structure	Hazardous noise	6
	Ergonomics, repetitive motion, lifting	7
	Heat and cold stress	8

a. Monitoring and sampling will be conducted as deemed appropriate by project Industrial Hygiene and Radiological Control personnel based on specific tasks and site conditions.

PGS = Packaging Glovebox System
RCS = Retrieval Confinement Structure

Table 3-2. Monitoring instrument category and description.

Instrument Category	Instrument Category Number Description[a]
1	**Alpha:** Count rate—Bicron NE Electra (DP-6 or AP-5 probe) or equivalent. Stationary—Eberline RM-25 (HP-380AB or HP-380A probe) or equivalent. **Beta-gamma:** Count rate—Bicron NE Electra (DP-6, BP-17 probes) or equivalent. Stationary—Eberline RM-25 (HP-360AB probe) or equivalent. Criticality alarm system Fissile material monitor
2	CAM (alpha)—ALPHA 7-A-1 (in-line and radial sample heads, pump, RS-485) or equivalent (as required). CAM (beta)—AMS-4 (in-line and radial head, pump RS-485) or equivalent (as required). Grab sampler—SAIC H-810 or equivalent.
3	**Organic vapor:** Direct-reading instruments (photoionization detector, flame ionization detector, infrared detector, or other as determined by IH), detector tubes or grab samples, or organic vapor monitor canisters or badges. **Dust:** Direct-reading instrument (miniram).
4	**Organic vapors and other airborne constituents, particulate or hazardous atmospheres:** Personal sampling pumps with appropriate media for partial and full period sampling using NIOSH or OSHA-validated methods, direct-reading instruments, or remote sensing detectors.
5	**Silica dust, respirable:** NIOSH 7500 or equivalent, personal sampling pump, 10-mm cyclone, full-period sampling.
6	Sound-level meter or dosimeter (A-weighted scale for time-weighed average dosimetry, C-weighted scale for impact dominant sound environments).
7	Observation and ergonomic assessment of activities in accordance with Management Control Procedure-2692.
8	**Heat stress:** wet-bulb globe temperature, ambient temperature. **Cold stress:** ambient air temperature, wind chill charts.

a. Equivalent instrumentation other than those listed may be used.

CAM = constant air monitor
NIOSH = National Institute for Occupational Safety and Health
OSHA = Occupation Safety and Health Administration
SAIC = Science Applications International Corporation

Table 3-3. Action levels and associated responses for project operational hazards.

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
Nonradiological nuisance particulates (not otherwise classified)	>10 mg/m^3 (inhalable fraction) >3 mg/m^3 (respirable fraction)	1. Substitute equipment or change method to reduce emissions at source 2. Verify engineering control operation (where in place) or institute engineering controls 3. Evaluate air movement (wind) conditions and reschedule tasks or reposition personnel to upwind position of source 4. Move operation to alternant location (with engineering controls if possible) 5. Use wetting or misting methods to minimize dust and particulate matter 6. IF wetting or misting methods prove ineffective, THEN don respiratory protection[a] (as directed by IH).
Nonradiological airborne contaminant (chemical, dust fume, fiber or particulate)	Based on individual contaminant exposure limit (ACGIH TLV or OSHA PEL) and 29 CFR 1910 (2002) or 1926 substance-specific requirements. Generally, sustained levels at the TLV or PEL in the worker's breathing zone for two minutes should be used as action limit. Where ceiling values or OSHA substance-specific action limit exists, use these values.	1. Substitute equipment or change method to reduce emissions at source 2. Verify engineering control operation (where in place) or institute engineering controls 3. Evaluate air movement (wind) conditions reschedule tasks or reposition personnel to upwind position of source 4. Move operation to alternant location (with engineering controls if possible) 5. IF engineering and administrative controls do not control contaminant below exposure limit, THEN reevaluate engineering and administrative controls or don respiratory protection[a] (as directed by IH) 6. IF OSHA substance-specific standard action limit is exceeded, THEN initiate applicable medical surveillance requirements.

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
Nonradiological hazardous atmosphere Chemical IDLH, oxygen deficient, oxygen enriched, 10% of chemical LEL	As defined by Management Control Procedure-2749, confined spaces are based on criteria such as oxygen level, individual contaminant IDLH value, and LEL. **Note**: *No entry into an area or space containing a hazardous atmosphere is permitted without the authorization of the project operations manager, or representative, in conjunction with health and safety professionals This authorization will be demonstrated through the use of approved operational procedures or other work control documents.*	1. Eliminate hazardous atmosphere through use of engineering controls. 2. Reschedule operations when area or space will not have hazardous atmosphere. 3. Evaluate space or area to be entered. IF the operation can be conducted outside the area or space, THEN perform operation without entry. 4. Measure atmosphere before initiating operation or personnel entry and verify acceptable entry conditions have been met (e.g., oxygen and LEL) and use engineering controls to maintain safe atmosphere and below specified exposure limit. Use permit system to authorize entry. 5. IF engineering control fails to control contaminant below safe atmospheric and exposure limit, THEN stop operation and evacuate personnel until safe atmosphere and specified entry conditions can be achieved. 6. IF IDLH atmosphere must be entered, THEN don appropriate air supplied respiratory protection (with escape capacity) and protective clothing.[a] At least one stand-by person dressed in proper PPE must be present for each entrant. **Note**: *The INEEL fire department also must be notified for any area or space entry into an IDLH atmosphere to ensure adequate rescue equipment and resources are in place.*

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
Hazardous noise levels	<85 dBA 8-hour TWA or equivalent TWA for 10- or 12-hour exposure.	No action.
	85 to 114 dBA or equivalent TWA for 10- or 12-hour exposure.	1. Isolate noise source or place sound-absorbing barrier in noise path 2. Hearing protection required to attenuate hazard to below 85 dBA 8-hour TWA or equivalent TWA for 10- or 12-hour exposure (device NRR).
	(a) >115 dBA (b) >140 dBA	(a) Isolate source, evaluate NRR for single device, double protection as needed. (b) Control entry around source and isolate source, only IH approved double hearing protection to be worn.
Radiation field	<5 mrem/hour	No action, no posting required.
	5 to 100 mrem/hour @ 30 cm (10 CFR 835.603b, 2002)	1. ALARA committee meeting and evaluation of individual workers ALARA goals or doses 2. Prejob planning and dry runs as deemed appropriate 3. Placement of shielding as feasible. Required Posting: Caution, Radiation Area Supplemental Posting: RWP and Personnel Dosimeter Required for Entry Required Training: Radiological Worker I or II training

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
	>100 mrem to 500 Rad @ 100 cm (10 CFR 835.603b, 2002)	**No entry unless authorized by the project operations manager (or designated alternate), or the project RadCon personnel in conjunction with the radiological engineer.** 1. ALARA committee meeting and evaluation of individual workers ALARA goals or doses 2. Prejob planning and dry runs as deemed appropriate 3. Prejob briefing (as applicable) 4. Placement of shielding as feasible. Required posting: Caution or Danger, High Radiation Area Supplemental posting: Personnel Dosimeter, Supplemental Dosimeter, and RWP Required for Entry[c] Required training: Radiological Worker I (with high radiation area training) or II training
Radionuclide contamination	Removable contamination levels 1 to 100 times the values in Table 2-2 of the INEEL RCM[b] (10 CFR 835.603d, 2002)	Bioassay submittal (as required) Respiratory protection (as deemed appropriate) Required posting: Caution or Danger, High Contamination Area Supplemental posting: RWP and Protective Clothing Required for Entry Required training: Radiological Worker II training

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
	Removable contamination levels >100 times the values in Table 2-2 of the INEEL RCM[b] (10 CFR 835.603d, 2002)	**No entry unless authorized by the project operations manager (or designated alternate), or the project RadCon manager in conjunction with the radiological engineer.** 1. ALARA committee meeting and evaluation of individual workers ALARA goals or doses 2. Prejob planning and dry runs as deemed appropriate 3. Prejob briefing 4. Supplied breathing air (as deemed appropriate) Bioassay submittal (as required). Required Posting: Caution or Danger, High Contamination Area Supplemental posting: RWP and Protective Clothing Required for Entry Required training: Radiological Worker II training
Airborne radioactivity	Airborne concentrations (μCi/ml) >30% of and derived air concentration value (10 CFR 835.603d, 2002)	**No entry unless authorized by the project operations manager (or designated alternate), or the project RadCon manager in conjunction with the radiological engineer.** 1. ALARA committee meeting and evaluation of individual workers ALARA goals or doses 2. Prejob planning and dry runs as deemed appropriate 3. Prejob briefing 4. Supplied breathing air. Bioassay submittal and lung count (as deemed appropriate) Required posting: Caution, Contamination Area Supplemental posting: RWP and Protective Clothing Required for Entry Required Training: Radiological Worker II training

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
Response to abnormal radiological conditions or alarms	Supplemental radiation dosimetry or area radiation monitor alarm	1. Stop work activities and place the area in a safe condition (i.e., secure excavator equipment, terminate activities that may result in more severe conditions) 2. Alert others 3. Affected individuals exit the area 4. Notify RadCon personnel.
	Personal contamination monitor alarm	1. Remain in the immediate area 2. Notify RadCon personnel 3. Take actions to minimize cross-contamination (e.g., putting a glove on a contaminated hand) 4. Take follow-up actions in accordance with Article 541 of the INEEL RCM Article 541 (PRD-183).
	Constant air monitor alarm	1. Stop work activities and place the area in a safe condition (i.e., secure excavator equipment, terminate activities that may result in more severe conditions) 2. Warn others in area and exit the area 3. Notify RadCon personnel.
	Spill of radioactive material	1. Stop or secure the operation causing the spill[d] 2. Warn others in the area 3. Isolate the spill area if possible 4. Minimize individual exposure and contamination 5. Secure unfiltered ventilation 6. Notify RadCon personnel.

Table 3-3. (continued).

Contaminant or Agent Monitored	Action Level	Response Taken If Action Level is Exceeded
	Criticality alarm	1. Immediately evacuate the area, without stopping to remove protective clothing or perform exit monitoring 2. Report to designated assembly area.
	Fissile material monitor set point alarm or 200 FGE indicator	1. Identify source of high FGE material 2. Notify RadCon personnel 3. Take corrective actions to separate or split high FGE material into two or more containers of less than 200-g FGE 4. Maintain critically safe storage configuration in accordance with limiting condition for operation.
Other facility or INEEL alarms	Project operations, RWMC or INEEL alarm	See Section 10.6 for emergency response action following facility or INEEL alarms.

a. Respiratory protection and clothing as prescribed by the project IH and RadCon personnel (based on contaminant of concern). See Section 5 for additional PPE requirements.
b. *Manual 15A—Radiation Protection—INEEL Radiological Control Manual* (PRD-183).
c. Access requirements may be deleted or modified if personnel access is specifically prohibited.
d. For radioactive spills involving highly toxic chemicals, workers should immediately exit the area without attempting to stop or secure the spill. They should then promptly notify the IH or INEEL HAZMAT team and Project RadCon personnel.

ACGIH = American Conference of Governmental Industrial Hygienists
ALAR = as low as reasonably achievable
CFR = *Code of Federal Regulation*
dBA = decibal A-weighted
FGE = fissile gram equivalent
HAZMAT = hazardous material
IDLH = immediately dangerous to life or health
IH = Industrial Hygiene
INEEL = Idaho National Engineering and Environmental Laboratory
LEL = lower explosive limit NRR = noise reduction rating
OSHA = Occupational Safety and Health Administration
PEL = permissible exposure limit
PRD = program requirements document
RadCon = Radiological Control
RCM = *Radiological Control Manual*
RWMC = Radioactive Waste Management Complex
RWP = radiological work permit
TLV = threshold limit value TWA = time-weighted average

3.2 Exposure Limits

Only limited entry into the RCS is anticipated (e.g., during overburden removal tasks, to stage equipment, and for repairs). Exposure limits identified in Table 3-3 serve as the initial action limits for specific project operations and contaminants. Radiological control and Industrial Hygiene personnel will conduct monitoring of project operations with direct-reading instruments and stationary monitors, collect swipes, and conduct full- and partial-period air sampling, as deemed appropriate, in accordance with applicable TPRs, MCPs, and other guidelines. As new project processes or hazards are introduced, each will be evaluated and controlled in accordance with PRD-25. Action limits should be adjusted as required based on changing site conditions, exposure mitigation practices, and PPE levels. Such changes will be reflected in applicable work control documents, permits, and procedures.

3.3 Environmental and Personnel Monitoring

The potential for exposure to radiological and nonradiological hazards exists during project operations. All project operations personnel who handle, store, transport, and conduct disposal or decontamination activities will be protected from radiological and nonradiological contaminants to the extent feasible through the use of engineering controls, work controls, and PPE. However, the potential for exposure to these contaminants cannot be eliminated. Environmental and personnel monitoring will be conducted to determine the effectiveness of these exposure control practices and assist health, safety, and radiological professionals in establishing additional administrative controls and PPE requirements.

Industrial Hygiene and RadCon personnel will conduct monitoring with direct-reading instrumentation, collect contamination control swipes, and conduct full- and partial-period air sampling during project operations in accordance with applicable MCPs, OSHA substance-specific standards, and as stated on project operational RWPs. Instrumentation listed on Table 3-1 (or equivalent) will be selected based on the Site-specific conditions and contaminants associated with OU 7-10 Project tasks. The RCT and IH will be responsible for determining the best monitoring technique for radiological and nonradiological contaminants (respectively). Safety hazards and other physical hazards will be monitored and mitigated as outlined in Section 2.

3.3.1 Industrial Hygiene Area and Personal Monitoring and Instrument Calibration

The assigned OU 7-10 Project IH will conduct full- and partial-period sampling of airborne contaminants and monitoring of physical agents during operations at a frequency deemed appropriate based on direct-reading instrument readings and changing conditions. When performed, all air sampling will be conducted using applicable NIOSH, OSHA, or other validated method. Both personal and area sampling and remote sensing monitoring may be conducted.

Various direct-reading instruments may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by OU 7-10 Project operations conditions, direct-reading instrument results, observation, professional judgment, and in accordance with the MCP-153, "Industrial Hygiene Exposure Assessment."

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing IH protocol, and in conformance with MCP-2391, "Calibration Program," and in conformance with the companywide safety and health manuals, *Safety and Health—Occupational Safety and Fire Protection* (Manual 14A, 2003) and *Safety and Health—Occupational, Medical, and Industrial Hygiene* (Manual 14B, 2003). Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded as stated in Section 12.

3.3.2 Radiological Monitoring and Instrument Calibration

Radiological instrumentation to be used during OU 7-10 Project operations will include alpha and beta-gamma CAMs positioned in strategic locations identified by RadCon personnel. Stationary beta-gamma and alpha self-survey instruments for hand monitoring will be located in close proximity to all gloveports. Radiation area monitors will be centrally located to identify any high radiation source when it is uncovered in the retrieval area or in a glovebox. The PCMs for automated whole-body survey will be located at normal egress points. Additionally, scalers, high-volume samplers, lapel samplers, and other instrumentation will be available to collect and quantify radiological contamination levels.

In addition to these routine radiological monitoring and sampling instruments and equipment, other instrumentation provided for project operations will include a criticality alarm system (CAS) and FMM system. The CAS detectors are set to alarm at 100 mrem/hour. The CAS will alarm on a high radiation (high alarm) condition or on a loss of signal (low alarm). An alarming CAS would cause an evacuation of personnel within the WMF-671 WES and from areas surrounding the WMF-671 WES.

Radiological monitoring of radiation and contamination will be conducted during OU 7-10 Project operations to ensure that personnel are given adequate protection from potential radiological exposure. Instruments and sampling methods listed in Table 3-2 may be used by the RCT as deemed appropriate and as required by general or task-specific RWPs. When conducted, monitoring will be performed in accordance with *Radiation Protection Procedures* (Manual 15B, 2003) and *Radiological Control Procedures* (Manual 15C, 2003). The data obtained from monitoring will be used by RadCon personnel to evaluate the effectiveness of OU 7-10 Project engineering controls, decontamination methods and procedures, and to alert personnel to potential radiation sources.

All portable survey instruments will be source-checked daily to ensure they are within the specified baseline calibration limits. Accountable radioactive sources will be maintained in accordance with MCP-137, "Radioactive Source Accountability and Control." All radiological survey and monitoring equipment will be maintained and calibrated in accordance with the manufacturer's recommendations, existing RadCon protocol, in accordance with companywide *Radiation Protection Procedures* (Manual 15B, 2003) and in conformance with MCP-93, "Health Physics Instrumentation."

3.3.3 Fissile Material Monitoring

The FMM system is used to monitor the accumulation of fissile materials in new waste drums during the drum loadout process. Waste types requiring fissile monitoring are listed below:

- Intact HEPA filters
- HEPA filter media
- Materials not distinguishable from HEPA filter media
- Intact graphite molds and large chunks of graphite molds (i.e., pieces greater than 2 in. in diameter)
- Other containerized unknown waste materials with potential of having unsafe masses of plutonium.

These waste types may not undergo fissile monitoring if new data become available that indicate that the actual drum loadings are less than 200 g.

A drum assay station will be set up to ensure to ensure the following drum loading and storage requirements are met:

- Fissile-loading limits of 200 g per drum
- More than 380-g FGE per drum for criticality safety fissile material content (drum spacing and handling).

Any established assay station or system will be adequately shielded and equipped with interlocks to prevent exposure to assay operators.

3.3.4 Personnel Radiological Exposure Monitoring

Personal radiological monitoring will be conducted during OU 7-10 Project operational activities to quantify radiation exposure and potential for uptakes as stated in the general or task-specific RWP. This will include the use of external dosimetry, surface monitoring, and internal dosimetry methods to ensure that engineering controls, administrative controls, and work practices are effectively mitigating radiological hazards. General ALARA considerations are discussed further in Section 4.4.

3.3.4.1 External Dosimetry. Dosimetry requirements will be based on the radiation exposure potential during OU 7-10 Project operations. All personnel who enter OU 7-10 Project operational areas will be required to wear a minimum of a TLD and other personal dosimetry devices (e.g., albedo dosimetry) specified by RadCon personnel, in applicable RWPs, and in accordance with the *Manual 15A—INEEL Radiological Control Manual* (PRD-183).

The Radiological Control and Information Management System (RCIMS) will be used to track external radiation exposures to OU 7-10 Project personnel and to serve as the administrative control mechanism for working in accordance with individual RWPs. Individual OU 7-10 Project personnel are responsible for ensuring all required personal information is provided to RadCon personnel for entry into RCIMS and logging in when electronic dosimeters are used.

3.3.4.2 Internal Monitoring. The purpose of internal dose monitoring is to demonstrate the effectiveness of contamination control practices and to document the nature and extent of any internal uptakes that may occur. Internal dose evaluation programs will be adequate to demonstrate compliance with 10 CFR 835 (2002), "Occupational Radiation Protection." The requirement for whole body counts, lung counts, and bioassays will be based on specific OU 7-10 Project operational evaluations conducted by the assigned radiological engineer. Select OU 7-10 Project operations personnel will be entered into a plutonium bioassay program based on the hazards associated with individual job functions. Bioassay requirements will be specified on the RWP and OU 7-10 Project personnel will be responsible for submitting required bioassay samples upon request.

4. ACCIDENT AND EXPOSURE PREVENTION

The OU 7-10 Glovebox Excavator Method Project operations will present numerous safety, physical, chemical, and radiological hazards to personnel conducting these activities. It is critical that all personnel understand and follow the requirements of this HASP. Project facility design features, engineering controls (confinement), hazard isolation, specialized work practices, and the use of PPE will be in place to eliminate or mitigate all potential hazards and exposures. However, given the nature of the OU 7-10 Project scope and the waste material being excavated, all hazards cannot be eliminated. Personnel are responsible for the identification and control of hazards in their respective project work areas in accordance with Integrated Safety Management System (ISMS) principals and practices.

Note: Hazards will not be left unmitigated without implementing some manner of controls or abatement (e.g., engineering controls, administrative controls, or the use of PPE).

Personnel should use stop work authority in accordance with MCP-553, "Stop Work Authority," where it is perceived that imminent danger to personnel, equipment, or the environment exists.

This HASP is to be used in conjunction with PRD-25 and OU 7-10 Project work authorization and control documents such as STD-101; work orders; JSAs; MCP-3562, "Hazard Identification, Analysis, and Control of Operational Activities"; and OU 7-10 Project operational technical procedures. Where appropriate, MCP-3562 and Guide-6212, "Hazard Mitigation Guide for Integrated Work Control Process," mitigation guidance will be incorporated into applicable work controls, JSAs, and RWPs.

4.1 Voluntary Protection Program and Integrated Safety Management System

Project operations will incorporate Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Personnel will take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The **ISMS** is focused on the **system** side of conducting operations and **VPP** concentrates on the **people** aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. The INEEL and its subcontractors participate in VPP and ISMS. This OU 7-10 Project operations HASP includes all elements of both systems. The five key elements of VPP and ISMS and their corresponding HASP sections are as shown in Table 4-1.

4.2 General Safe-Work Practices

Sections 1 and 2 defined the *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* (Holdren and Broomfield 2003) and associated operations-specific hazards and mitigation. Section 3 provided the exposure monitoring and sampling strategy for ensuring the effectiveness of facility safety systems and engineering control. The following general safe-work practices are mandatory for all personnel to further reduce the likelihood of accidents, injuries, and exposures. In addition, all visitors permitted to enter OU 7-10 Project operational work areas must follow these requirements. Failure to follow these practices may result in permanent removal from the OU 7-10 Project and other disciplinary actions. The OU 7-10

Project shift supervisor in conjunction with assigned health and safety and RadCon personnel will be responsible for ensuring the following safe-work practices are adhered to OU 7-10 Project operations:

Table 4-1. Five key elements of the Voluntary Protection Program and Integrated Safety Management System and corresponding sections of the Operable Unit 7-10 Project health and safety plan.

Voluntary Protection Program	Integrated Safety Management System	Project Operations Health and Safety Plan Section
Work site analysis	Define work scope	Section 1
	Analyze hazards	Sections 2, 3, 5 and 8
Hazard prevention and control	Develop and implement controls	Sections 2, 3, 4, 5, 7, 10 and 11
Safety and health training	Perform within work controls	Section 6
Employee involvement		Sections 2, 3 and 4
Management leadership	Provide feedback and improvement	Sections 6 and 9

- Limit access to OU 7-10 Project operations areas to authorized personnel only, in accordance with PRD-1007, "Work Coordination and Hazard Control."

- Personnel must be aware of and comply with all safety signs, tags, barriers, and color codes as identified in PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes."

- Be familiar with the physical characteristics of the OU 7-10 Project facilities and operational requirements, including, but not limited to the following:

  - Layout of the WMF-671 WES, controlled areas, and egress routes

  - Project waste types, labeling, and storage requirements

  - Facility safety-significant structures, systems, and components; technical safety requirements; and limiting conditions of operation

  - Facility and RWMC warning devices and alarms

  - Communications with the OU 7-10 Project and RWMC shift supervisors

  - Major SDA roads and means of access to and from the OU 7-10 Project

  - Location of facility emergency response equipment and first-aid supplies.

- Be alert for dangerous situations (e.g., facility alarms, spills, accidents, and injuries) and report dangerous situations and near misses to the shift supervisor. The shift supervisor will make required notification in accordance with Section 10.

- Provide adequate information to the oncoming shift personnel, including equipment and system status and inspection logs, and communicate all systems, monitors, and safety components that are nonoperational and ensure they are tagged as to their appropriate status (e.g., out-of-service or do not use).

- Plan and review all operational tasks before initiating the activity. Verify all work control documents (e.g., the RWP, JSA, TPR, or work order) are current and correct for the activity. A prejob briefing is required to be conducted for all activities in accordance with MCP-3003, "Performing Prejob Briefings and Post-Job Reviews."

- Conduct all OU 7-10 Project operations in accordance with the applicable TPR or work order. All operational activities will be conducted as stated in the applicable work control document including hold points and requirements for initials upon completion of certain steps (use Type 1 TPR only) or work orders. Use Type 2 TPRs will be followed in a step-by-step sequence.

Note: It is the responsibility of all operations personnel to identify, understand, and follow the appropriate work controls for their operational activities.

- All personnel shall have the authority to initiate STOP WORK actions in accordance with MCP-553, "Stop Work Authority."

- Personnel shall be familiar with OU 7-10 Project facility tools and equipment for which they are responsible to operate including operating limitations, maintenance, inspection, and manufacturer's operating instructions requirements. Tools and equipment shall only be used for their intended use.

- Understand the PPE requirements for all tasks as stated on the applicable JSA or work order. This includes the proper use and limitation of all PPE. If questions arise about PPE, contact the assigned IH, safety professional, or RCT as applicable.

- Personnel must wear all required dosimetry as stated on the RWP. This includes any supplemental dosimetry (e.g., electronic dosimeters and albedo dosimeters). Respond to all radiological alarms including but not limited to CAMs, criticality system, radiation, and PCM alarms.

- Avoid direct contact with OU 7-10 Project waste material or containers. Personnel shall not walk through spills or other areas of contamination and shall avoid kneeling, leaning, or sitting on equipment or surfaces that may be contaminated.

- Personnel shall not eat, drink, chew gum or tobacco, smoke, apply cosmetics or sunscreen, or perform any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials in OU 7-10 Project operations areas, except within designated administrative break areas and only after having completed required contamination surveys.

- Practice good housekeeping at all times. Turn in or place tools in the designated storage location after use. Put waste materials in the appropriate waste container or receptacle. If there is a question as to where to dispose of a waste article, personnel should ask the supervisor or the shift supervisor.

- Additional health, safety, and radiological requirements will be identified in OU 7-10 Project operations technical procedures and work packages.

4.3 Subcontractor Responsibilities

Where subcontractors are used to support OU 7-10 Project operations, subcontractors are responsible for meeting all applicable INEEL MCP, PRD, VPP, and ISMS flow-down requirements such as those listed on the completed INEEL Form 540.10, "Safety Checklist of Subcontractor Requirements for On-Site Nonconstruction Work"; *Subcontractor Requirements Manual* (TOC-59 2003); and contract

general and special conditions. Additionally, subcontractors are expected to take a proactive role in hazard identification and mitigation while conducting operational support tasks. Subcontractors will report unmitigated hazards to the OU 7-10 Project shift supervisor after taking protective actions (within the documented work controls) and emergency protective actions.

4.4 Radiological and Chemical Exposure Prevention

The OU 7-10 Project operational facilities (i.e., RCS and PGS) have been designed to minimize exposure to personnel from the radiological and chemical contaminants in OU 7-10 during excavation and glovebox operations. The concept of defense-in-depth has been applied to protect personnel from the most significant hazards and provide additional barriers, engineering controls, access restrictions, and administrative controls to abate radiological and chemical exposure to personnel. Where entry into contaminated areas is required, chemical, radiological, and physical hazards will be mitigated through the use of work procedures and hold points, area and personnel monitoring, and PPE where possible or to minimize them where engineering controls are not feasible. All personnel are responsible for understanding the hazard identification and mitigation measures necessary to prevent or reduce exposures. This section presents radiological and chemical exposure prevention strategies for use where engineering controls are not feasible and as good work practices.

4.4.1 Radiological Exposure Prevention—As Low as Reasonably Achievable Principles

The radiation exposure of personnel will be controlled such that exposures are well below regulatory limits established in "Occupational Radiation Protection" (10 CFR 835, 2002) and that no radiation exposure occurs without commensurate benefit. All personnel have the responsibility for following ALARA principles and practices.

Note: Unplanned and preventable exposures are considered unacceptable.

The OU 7-10 Project shall establish work controls that will ensure that personnel are adequately protected from known sources of radiation in OU 7-10 Project operations areas. The issuance of RWPs, establishment and posting of radiological controlled areas, and review of OU 7-10 Project operational activities by the RWMC ALARA committee will form the basis for controlling exposure to ionizing radiation during OU 7-10 Project operations. Personnel working at the OU 7-10 Project must strive to keep both external and internal radiation doses ALARA by adopting the following practices in the following sections.

4.4.1.1 External Radiation Dose Reduction. Sources for external radiation exposure will be primarily from radioisotopes in the OU 7-10 waste (see Table 2-1). Project operational processes have been designed to minimize radiation dose to workers through barriers and shielding in waste excavation and handling areas (i.e., RCS and PGS). Area radiation monitors and criticality system alarms have been installed to alert operations personnel if radiation levels increase in these working areas. Personal supplemental electronic dosimetry will be programmed to alarm at radiation levels much below the area monitors.

The RWPs written for OU 7-10 Project operations will define radiological hold points, required dosimetry, RCT coverage, radiological controlled areas, and radiological limiting conditions in accordance with MCP-7, "Radiological Work Permit." Radiological Control personnel will participate in the prejob briefing required by MCP-3003 to ensure all personnel understand the dose rate limits and limiting conditions on the RWP. All personnel will be required to read and acknowledge the RWP

requirements before being allowed to sign the RWP (or scan the RWP bar code in the RCIMS) and obtain electronic dosimetry.

Basic ALARA protective measures used to reduce external doses include (1) minimizing time in radiation areas, (2) maximizing the distance from known sources of radiation, and (3) using shielding whenever possible. Specific examples of these methods are provided in the following subsections.

4.4.1.1.1 Methods for Minimizing Time in Radiation Areas—Personnel will incorporate the following methods for minimizing time in radiation areas:

- Preplan all work activities and conduct dry runs where necessary to validate procedures and equipment functional testing
- Plan and discuss the tasks before entering a radiation area (including having all equipment and tools prepared)
- Perform as much work as possible outside radiation areas and take advantage of lower dose rate areas (as shown on the radiological survey maps)
- Take the most direct route to the task area and work efficiently
- Hold technical discussions outside radiation areas if problems occur in the radiation areas, then return to the work area to complete the task
- Know stay time and use appropriate signal and communication method to inform others in the area when the stay time is up, if stay times are required
- Respond to electronic dosimetry alarms by notifying others in the area and the RCT, and exit the radiation area through the designated entry and exit point
- Know individual current dose and dose limit.

Note: If RCIMS indicates an individual is approaching or has exceeded the dose limit, the RCT should be notified immediately and the worker should not proceed into the radiation work area.

4.4.1.1.2 Methods for Maximizing Distance from Radiation Sources—Personnel will incorporate the following methods for maximizing the distance from radiation sources:

- Use remote operated equipment or controls where available
- Stay as far away from the source of radiation as possible (extremely important for point sources where, in general, if the distance between the source is doubled, the dose rate falls to one-fourth of the original dose rate)
- Become familiar with the radiological survey map for the OU 7-10 Project operations area where work will be performed, as well as high and low dose-rate locations, and take advantage of low dose-rate areas.

4.4.1.1.3 Proper Use of Shielding—Personnel will incorporate the following methods for the proper use of shielding as a protective measure used to reduce external radiation doses:

- Know what shielding is required and how it is to be used for each radiation source
- Take advantage of the equipment and enclosures for shielding from radiation sources
- Verify interlocks are functional and use shielding when operating drum assay equipment
- Wear safety glasses to protect eyes from beta radiation.

4.4.1.2 Internal Radiation Dose Reduction. The most significant internal radiation dose potential exists during entry into the RCS for manual overburden removal, from repairs, and from routine and unscheduled maintenance activities that may be required (during excavation and waste processing) within the RCS and PGS. An internal dose is a result of radioactive material being taken into the body. Radioactive material can enter the body through inhalation, ingestion, absorption through wounds, or injection from a puncture wound. Reducing the potential for radioactive material to enter the body is critical to avoid an internal dose. The following are methods to minimize the hazard of an internal radiation dose:

- Preplan all work activities and conduct dry runs where necessary to validate procedures and equipment functional testing
- Verify CAMs and other area contamination monitors and samplers are functional before entry into contamination or airborne radioactivity areas
- Review the RadCon survey map for areas of known contamination and potential high contamination sources and minimize or avoid activities in those areas (where possible)
- Wear protective clothing and respiratory protection as identified on the RWP, perform all respirator leak checks, and inspect all PPE before entering contaminated areas or areas with airborne radioactivity
- When inside contaminated areas, do not touch your face (adjust glasses or PPE) or other exposed skin
- Respond to all CAM alarms or other indications of increased contamination levels (RCT directions)
- When exiting contaminated areas, follow all posted instructions and remove PPE in the order prescribed (if questions arise, consult RadCon personnel)
- Conduct whole-body personnel survey when exiting the contaminated area, then proceed directly to the PCM
- Report all wounds or cuts (including scratches and scrapes) before entering radiologically contaminated areas
- Wash hands and face before eating, drinking, smoking, or engaging in other activities that may provide a pathway for contaminants.

Monitoring for radiation and contamination during project tasks will be conducted in accordance with the RWP; PRD-183; companywide *Manuals 15A* (PRD-183), *Radiation Protection Procedures*

(Manual 15B, 2003), and *Radiological Control Procedures* (Manual 15C, 2003); and as deemed appropriate by RadCon personnel.

4.4.2 Chemical and Physical Hazard Exposure Avoidance

Note: Identification and control of exposures to carcinogens will be conducted in accordance with MCP-2703, "Carcinogens."

The primary potential for exposure to nonradiological contaminants is the same as the radiological sources (i.e., OU 7-10 waste [see Table 2-2]). Additionally, chemicals (e.g., fuels, lubricants, and cleaners) will be used in support of OU 7-10 Project operations. An MSDS is required to be available for all chemicals used in accordance MCP-2715, "Hazard Communication." All chemicals entering the OU 7-10 Project must be entered into and tracked using the INEEL Chemical Management System. The INEEL Chemical Management System is used for maintaining and tracking the inventory of chemical containers and basic functionality includes the following:

- Identify container
- Track the location and location changes of a container
- Define the contents of a container at any point in time
- Record distributions into and out of a container
- Record distributions to a waste stream
- Provide a running inventory based on the distributions entered
- Produce regulatory reports from the data entered
- Calculate conversions from one unit of measure to another
- Define container update authorization for a location
- Provide flexibility in how to manage chemicals.

Note: Project waste streams are not considered chemicals for purposes of entry into INEEL Chemical Management System.

Threshold limit values or other occupation exposure limits have been established for numerous chemicals and physical agents (e.g., noise, heat, or cold stress) that may be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects. The TLV TWA is a TWA concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Action limits (instantaneous concentrations for short time periods) have been established to further reduce the likelihood of exceeding TLVs or as regulatory triggers for additional medical surveillance and actions. These concentrations for nonradiological contaminants of concern are provided in Table 2-3.

The RCS and PGS have been designed to minimize exposure to personnel from the radiological and chemical contaminants of concern (see Tables 2-1 and 2-2). Design features include a negative

pressure HEPA filtered ventilation system, remote waste handling equipment and tools, and double barriers where appropriate. These controls will eliminate or mitigate chemical and physical hazards to a great extent.

Where personnel are required to enter the RCS or PGS during excavation and waste handling activities (e.g., for repairs and routine or unscheduled maintenance), additional exposure monitoring and PPE will be required. Supplied breathing air and protective clothing is available for personnel required to enter contaminated or suspected contaminated areas to perform these tasks. In addition, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used to reduce exposure potential. Some other exposure minimization methods include the following:

- Preplan all work activities and conduct dry runs where necessary to validate procedures and equipment functional testing
- Wear all required PPE, inspecting all pieces before donning, and taping all seams
- Change PPE if it becomes damaged or shows signs of degrading
- Minimize time in direct contact with hazardous material or waste
- Doff PPE following posted radiological instructions (i.e., rolling outer surfaces in and down) and follow doffing sequence
- Wash hands and face before eating, smoking, or engaging in other activities that may provide a pathway for contaminants.

Exposure to nonchemical hazards (e.g., hazardous noise) and physical hazards will be controlled through the implementation of existing INEEL MCPs and PRDs in conjunction with the PRD-25 process. New or previously unidentified hazards shall be reported o the appropriate health, safety, or RadCon personnel.

4.5 Buddy System

The two-person or buddy system will be used during some OU 7-10 Project operations. The buddy system is most often used during operational activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards may impede a person's ability to self-rescue or in situations that are IDLH. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The need to use the buddy system during OU 7-10 Project operations will be determined by the assigned IH or safety engineer in conjunction with the shift supervisor and RadCon personnel.

5. PERSONAL PROTECTIVE EQUIPMENT

Facility designed engineering safety systems and components for the OU 7-10 Glovebox Excavator Method Project will serve as the primary hazard controls during OU 7-10 Project operations to confine radiological and chemical waste hazards. Additionally, chemical and physical hazards will be encountered in conjunction with routine operational activities as presented in Section 2. Where hazards cannot be eliminated through engineering or administrative controls, PPE will be used to protect personnel.

Project operations personnel and visitors who enter the OU 7-10 Project operational areas must be protected against potential safety, health, and radiological hazards. The PRD-25 will be used to evaluate all OU 7-10 Project activities and define the appropriate PPE for all operational activities and areas in accordance with 29 CFR 1910 (2002) Subpart I hazard assessment requirements. This section provides guidance for the section and use of PPE to be worn for OU 7-10 Project operations and contingencies for upgrading or downgrading PPE. The actual PPE requirement for specific OU 7-10 Project operational tasks will be specified in applicable JSAs, technical procedures, work packages, SWP, or RWP.

The purpose of PPE is to shield or isolate personnel from radiological, nonradiological, physical, and biological hazards that cannot be eliminated though engineering or other controls. It is important to realize that no single PPE ensemble can protect against all hazards under all conditions and that proper work practices and adequate training will serve to augment PPE to provide the greatest level of protection to workers.

The PPE will be selected, issued, used, and maintained in accordance with PRD-5121. Selection of the proper PPE to protect facility personnel is based on the following:

- Specific conditions and nature of the tasks (e.g., overburden excavation, glovebox operations, waste container handling, and decontamination)
- Potential contaminant routes of entry
- Physical form and chemical characteristics of OU 7-10 Project chemicals or waste contaminants
- Acute and chronic effects from exposure to OU 7-10 Project chemicals or waste contaminants
- Local and systemic toxicity of OU 7-10 Project chemicals or waste contaminants
- Potential exposure levels (surface and airborne)
- The hazard analysis (Section 2) evaluation of this HASP.

Radiological contamination anticontamination clothing requirements will be developed in accordance with MCP-432 and listed on the RWP.

The PPE is generally divided into two broad categories: (1) respiratory protective equipment and (2) personal protective clothing. Table 5-1 provides guidance in the selection process for respiratory and protective clothing. Listed PPE levels may be augmented by SWP- or RWP-specific requirements. Project operations will be evaluated to determine the most appropriate PPE levels and any modifications required. Potential exposures and hazards associated with OU 7-10 Project operations will be monitored (as discussed in Section 3) during the course of the project to evaluate changing conditions and to determine PPE level adequacy and the need for modifications.

Table 5-1. Respiratory and protective clothing selection guidance.

Hazard	Level of Protection
Respiratory PPE Selection[a]	
Not IDLH or oxygen-deficient atmospheric conditions. Gaseous, vapor, particulate, and aerosol chemicals or radionuclides.	Level C—full-facepiece, as determined by the IH or radiological control technician Level B—full-facepiece supplied air respirator with an air-purifying escape cartridge or air hood (bubble hood). HEPA and chemical combination cartridge for concentrations up to the protection factor of an air-purifying full-facepiece respirator and within the assigned derived air concentration[b] value.
IDLH or oxygen-deficient atmospheric conditions. Gaseous, vapor, particulate and aerosol chemicals or radionuclides.	Level B—full-facepiece, supplied air respirator with an escape-only SCBA or Level A—SCBA.
Protective Clothing Selection	
Low atmospheric-contaminant levels that are present under stable conditions. No anticipated immersion, splashes, or potential for unexpected contact with radiological or nonradiological contaminants.	Level D
Moderate atmospheric contaminants under relatively stable conditions; liquid splashes or other direct contact that do not have corrosive characteristics or can be absorbed by exposed skin. Low radionuclide contamination and airborne radioactivity levels.[c]	Level C
Moderate to high atmospheric contaminants under unstable conditions; potential for contact with wet contaminated surfaces and material that can saturate or permeate Level C protective clothing. Moderate radionuclide contamination and airborne radioactivity levels.[c]	Level B
High and unknown atmospheric contaminants; potential for contact with substances that pose a high hazard potential to the skin; high potential for splash, immersion, or exposure to unexpected vapors, gases, aerosols, or dusts that may present an IDLH situation and readily absorbed through the skin. High radionuclide contamination and airborne radioactivity levels.[c]	Level A[d] (not anticipated)

a. A HEPA or multichemical and HEPA combination cartridge may be selected by IH and Radiological Control personnel based on specific hazards.
b. Derived air concentration based on specific radionuclides.
c. Contamination levels and airborne radioactivity as defined by 10 CFR 835.603d 9 (2002).
d. Level A PPE is not anticipated to be required for personnel conducting project operations.

HEPA = high-efficiency particulate air
IDLH = immediately dangerous to life or health
IH = industrial hygienist
PPE = personal protective equipment
SCBA = self-contained breathing apparatus

5.1 Respiratory Protection

The primary objective will be to prevent or significantly reduce inhalation of potential toxic substances (i.e., air contaminated with harmful dusts, fumes, mists, gases, smokes, vapors, or airborne radioactivity). This will be accomplished as far as feasible through the implementation of existing OU 7-10 Project engineering controls (e.g., HEPA-filtered ventilation), confinements, and barriers. When effective engineering controls are not feasible or entry into the contaminated RCS or PGS areas is required, appropriate respirators will be selected and used.

The level and type of respiratory protection for OU 7-10 Project operations is operation-specific and relates directly to the airborne hazard for each given operation or activity. Assigned protection factors for respiratory devices are listed in MCP-2726, "Respiratory Protection," Appendix B, "Protection Factors."

All personnel required to wear respirators shall complete training and be fit-tested before being assigned a respirator. Requirements for respirator use, emergency use, storage, cleaning, and maintenance, as stated in MCP-2726 shall be followed.

5.2 Personal Protective Equipment Levels

The following sections provide general guidance on typical Hazardous Waste Operations and Emergency Response (HAZWOPER) levels of PPE. Project operational activities will be evaluated to determine the most appropriate PPE, which may or may not incorporate traditional HAZWOPER levels. When required to be worn, PPE requirements will be specified on applicable operational JSAs, RWP, and SWP (when written).

Table 5-2 lists PPE items typically included for the three traditional HAZWOPER levels of PPE. These PPE-level ensemble requirements will be determined by assigned OU 7-10 Project safety and health professionals in consultation with RadCon personnel based on the hazards presents, monitoring results, and nature of the operational task. Modifications to PPE levels will be made based on changing operational conditions and monitoring results. Such modifications are routinely employed to maximize efficiency and to meet operational-specific needs without compromising personnel safety and health.

5.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not for OU 7-10 Project operations with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards such as OU 7-10 Project operational support areas and low hazards areas of the WMF-671 WES.

5.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site chemical or radiological) contaminants have been well-characterized indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5% at sea level), and that no conditions exist that pose IDLH.

Table 5-2. Levels and options of personal protective equipment.

Personal Protective Equipment Level	Personal Protective Equipment Required[a]	Optional Personal Protective Equipment or Modifications
D	Coveralls or standard work clothes (coverall material type based on industrial hygiene determination). Hardhat (based on task-specific overhead hazards) meeting ANSI Z89.1-1969 requirements. Eye protection based on task-specific hazards (safety glasses meeting ANSI Z87.1-1968 [1968] requirements as a minimum). Hand protection (material based on type of work and hazardous materials being handled). Safety footwear (steel or protective toe) meeting ANSI Z41.1-1967 (1967) requirements, sturdy leather, or substantial footwear above the ankle for visitors, nonworkers, and construction tasks.	Chemical or radiological protective clothing (Tyvek or Saranex) by IH or RCT. Chemically resistant hand and foot protection (e.g., inner and outer gloves and boot liners). Radiological modesty garments under outer protective clothing (as required by the RWP). Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, and aprons).
C	Level D ensemble with the following respiratory and whole-body protection upgrades:[b] • Full-facepiece air purifying respirator equipped with a NIOSH-approved HEPA filter or chemical and HEPA combination cartridge (IH to specify cartridge type) • Standard Tyvek (or equivalent) coverall **OR** • Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) (IH to specify material).	Chemical-resistant outer shoe or boot cover (IH or RCT to specify material). Inner chemical-resistant gloves with cotton liners (as determined by the IH and RWP). Outer chemical-resistant gloves (as determined by the IH). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons). (Safety glasses not required if wearing a full-face respirator)

Table 5.2. (continued).

Personal Protective Equipment Level	Personal Protective Equipment Required[a]	Optional Personal Protective Equipment or Modifications
B	Level C ensemble with the following respiratory and whole body protection upgrades:[b,c] • Supplied breathing air system with escape capability. OR for IDLH environment • Full-facepiece supplied air respiratord with a 10-minute escape bottle or an escape air-purifying combination HEPA or chemical cartridge (except for oxygen deficient atmospheres) **OR** • SCBA • Chemical-resistant coveralls or encapsulating suit (Tyvek QC, Tychem 7500, Saranex 23-C, or equivalent) • Any other chemical or radiological personal protective equipment prescribed in Site-specific RWP or safe work permit • Chemical-resistant butyl or one-time-use natural latex outer boots (as determined by the IH and RWP) • Inner chemical-resistant gloves with cotton liners (as determined by the IH and RWP) Outer chemical-resistant Viton or polyvinyl alcohol gloves (as determined by the IH). **Note:** All seams must be taped and secured to prevent skin contact from hazardous substances in a soil, liquid, mist, and aerosolized form.	Chemical-resistant outer shoe or boot cover (IH or RCT to specify material) Radiological modesty garments under outer protective clothing (as required by RWP) Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons).
A	Not anticipated for OU 7-10 Project operations.	Not anticipated for OU 7-10 Project operations.

a. The personal protective equipment ensemble may be modified by the IH or RCT to provide protection from skin or other physical hazards.
b. Upgrades are determined by the IH in conjunction with other environment, safety, and health professionals.
c. Level B and A work will require approval from the project operations manager and coordination with the INEEL fire department.
d. Supplied air respirator hose length no more manufacturer's specification and under no circumstances greater than 300 ft).

ANSI = American National Standards Institute
HEPA = high-efficiency particulate air
IDLH = immediately dangerous to life or health
IH = industrial hygienist
INEEL = Idaho National Engineering and Environmental Laboratory
NIOSH = National Institute of Occupational Safety and Health
OU = operable unit
RCT = radiological control technician
RWP = radiological work permit
SCBA = self-contained breathing apparatus

Note: Personnel must inspect all PPE before donning and entry into any work area. Items found to be defective or that become unserviceable during use, will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. The PPE inspection guidance is provided in Table 5-3.

5.2.3 Level B Personal Protective Equipment

Level B PPE will be worn when personnel cannot be adequately protected with air purifying respirator because there are high levels of contaminants present, the appropriate respirator cartridges or combination is not available, a significant hazard exists for skin exposure, or IDLH or oxygen-deficient conditions exist. If IDLH conditions do not exist, then an escape air-purifying cartridge may be substituted for the escape bottle.

5.2.4 Level A Personal Protective Equipment

Level A PPE is not anticipated for OU 7-10 Project operations.

5.3 Personal Protective Clothing Upgrading and Downgrading

The OU 7-10-Project-assigned IH, industrial safety, and RadCon personnel will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading of PPE based on changing operational conditions (e.g., equipment, waste types, location of tasks) and is a normal occurrence. If changing conditions are encountered, work control documents (e.g., work order, RWP, and JSA) may need to be updated to reflect these changes or augmented by a SWP. Additional reasons for upgrading or downgrading are listed in the following subsections.

5.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded for the following reasons and work will halt until PPE upgrading has been completed:

- New, unstable, or unpredictable hazards or exposures identified
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Newly identified source or potential increasing concentration respiratory hazard(s) anticipated
- Operational activity change that may result in an increased contact with contaminants or triggering any of the criteria listed above.

5.3.2 Downgrading Criteria

The level of PPE will be downgraded under the following conditions:

- Elimination of hazard or completion of operational task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate hazard

- Sampling information or monitoring data that show contaminant levels to be stable and lower than initial or estimated levels

- Elimination of potential skin absorption or contact hazards.

5.4 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected before use and when in use during OU 7-10 Project operations in accordance with PRD-5121. Once PPE is donned, self-inspection will serve as the principal form of inspection. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work area exit point. Following required surveys (as required) PPE will be doffed and replaced. In addition, all PPE that becomes grossly contaminated or presents a potential source for the spread of such contamination will be required to be decontaminated or replaced.

Table 5-3 provides a general inspection checklist for common PPE items. Not all PPE ensemble items listed may be required for OU 7-10 Project operational tasks. Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. The assigned OU 7-10 Project IH, safety professional, or RCT should be consulted about specific PPE inspection criteria.

Table 5-3. Inspection checklist for personal protection equipment.

Personal Protection Equipment Item	Inspection
Respirators (full-facepiece air-purifying and supplied air respirators with escape-only SCBA bottles or escape cartridges)	**Before use:** • Verify that respirator id within three years of shelf life. • Ensure airline matches the airline respirator to be used (black hose). • Inspect airline hose connections (sections of hose) to ensure all are threaded or permanent metal-to-metal connections (no quick disconnect pieces). • Check condition of the facepiece, head straps, valves, connecting lines, fittings, and all connections for tightness. • Check cartridge to ensure proper type or combination are being used for atmospheric hazards to be encountered, and inspect threads and O-rings for pliability, deterioration, and distortion. • Check for proper setting and operation of regulators and valves, check all hose connections back to the breathing-air compressor, check the pressure to the airline station and on individual airline connections to ensure pressure is within required range (in accordance with the manufacturer's specifications). **Before entry into Level B area:** Ensure air compressor is providing adequate airflow when all personnel have airlines hooked up to the compressor manifold, in accordance with Management Control Procedure-2726.

Table 5-3. (continued).

Personal Protection Equipment Item	Inspection
Air hoods	• **Before use:** Ensure airline matches the air hood to be used Visually inspect all seams and surfaces for tears and cracks Pressurize air hood to check for pinholes or defective seams (no air should leak out when choking clear hood-piece) **Before entry into contaminated area:** Inspect all airline connections for tight fit (pull connections three times). Ensure air compressor is providing adequate airflow when all personnel have airlines hooked up to the compressor manifold.
Level D, C, and B clothing	**Before use:** Visually inspect for imperfect seams, nonuniform coatings, and tears. Hold personal protective equipment up to the light and inspect for pinholes, deterioration, stiffness, and cracks. **While wearing in the work zone:** Inspect for evidence of chemical attack such as discoloration, swelling, softening, and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure they are still intact.
Gloves	**Before use:** Pressurize rubber gloves to check for pinholes: trap air in glove and roll to inflate glove for inspection. No air should escape. **Leather gloves:** Inspect seams and glove surface for tears and splitting and verify no permeation has taken place.

SCBA = self-contained breathing apparatus

6. PERSONNEL TRAINING

Training of OU 7-10 Glovebox Excavator Method Project operations personnel is a key element of the hazard identification and mitigation process. In addition to required operational position-based training, all assigned OU 7-10 Project personnel who access the operations areas will be trained in requirements contained in this HASP and other safety and health documents. Personnel will receive training, as specified in the applicable section of the HAZWOPER standard (29 CFR 1910.120, 2002), RWMC, DOE, federal, state, and INEEL companywide manuals as applicable.

All OU 7-10 Project training will be developed, conducted, and maintained in accordance with *Training and Qualification* (Manual 12, 2002) and OU 7-10 Project or applicable facility supplemental training procedures. Companywide *Training and Qualification* describes the INEEL processes that ensure the INEEL work force is properly trained to work effectively and safely and ensures that all personnel in the company understand their roles, the role of management, and the role of the Training Directorate in training INEEL employees.

The OU 7-10 Project nuclear facility manager (NFM) or project operations manager controls all support activities, including training, necessary to operate and maintain the project. The NFM and operations manager are responsible for all aspects of efficient facility operation and maintenance and are responsible to ensure that all operational personnel are properly trained.

6.1 Training

Training personnel ensure that OU 7-10 Project personnel receive the training necessary to perform their job assignments safely and effectively. The Training Directorate oversees and coordinates training analysis, design, development, implementation, and evaluation, in close association with responsible management. The Training Directorate also ensures that employees who require qualification or certification meet the minimum qualification requirements and receive appropriate training. Other activities include tracking and maintaining training records.

Training settings and methods are carefully selected to optimize the trainee's learning experiences. They may include classroom training, web-based instruction, self-study, and on-the-job training as appropriate.

6.2 Personnel Selection

Personnel selection for the OU 7-10 Project complies with the company staffing procedures. Employee position descriptions are used for personnel selection and these position descriptions identify entry-level requirements for all INEEL personnel.

6.3 Qualification and Certification Processes

Qualification requires demonstration and documentation of experience, physical attributes, training, knowledge, and skills necessary to perform a specific job function. Supervisors are qualified by meeting entry-level requirements associated with the supervisory position and as identified in the project training implementation matrix. This ensures that supervisors possess the required knowledge and skills, when combined with their previous education, experience, and training, to perform responsibilities specific to their position. Positions that require qualification for the OU 7-10 Project include excavator operator, glovebox operators, radiological personnel, shift supervisors, and assigned health and safety professionals.

Certification is the formal endorsement by facility management of an individual who has completed the qualification(s) and other requirements (e.g., a physical examination, written examination, operational evaluation, and oral examination) related to a specific position. Examples of positions that require certification for the OU 7-10 Project include shift supervisor and excavator operator. The project training implementation matrix details positions of responsibility and those requiring additional training and certification.

6.4 Implementation of Training

The OU 7-10 Project operations manager is responsible for ensuring that crafts and maintenance personnel assigned to work at the OU 7-10 Project have the skills necessary for their particular craft. The OU 7-10 Project facility manager is responsible for ensuring that crafts and maintenance personnel are qualified to perform assigned work at the facility in accordance with *Training and Qualification* (Manual 12, 2002).

Facility prejob briefings and facility-specific CERCLA, hazard communication, and HAZWOPER training courses satisfy requirements of 29 CFR 1910.1200 (2002), "Hazard Communication," and 29 CFR 1910.120 (2002), respectively. Radiological Control personnel assigned to support OU 7-10 Project operations will participate in an ongoing training program in accordance with 10 CFR 835 (2002) in addition to OU 7-10 Project operations-specific training. Operators and shift supervisors have fissile material handling as a collateral duty and will receive fissile material handling training as part of their certification process.

The operations manager is responsible to ensure that personnel have an adequate level of facility knowledge, including a general overview of the facility, facility-specific hazards, safety, and applicable procedures. A thorough analysis of course work and other associated training required for OU 7-10 Project operations personnel requiring certifications or qualifications will be performed and a formal continuing training program for OU 7-10 Project will be developed. The project training implementation matrix details positions of responsibility and positions requiring additional training and certification.

Table 6-1 is a training guide provided to address basic HAZWOPER and radiological training requirements based on entry to OU 7-10 Project operations areas. This is not intended to be a complete list of OU 7-10 Project operational training requirements for all assigned personnel but lists the HAZWOPER access requirements for entry into the general operational areas. Individual training plans that reflect required training for individual employees will be developed for OU 7-10 Project operations personnel that specify required qualification and certification requirements. Individual training plans are revised at least annually or as needed.

Personnel requiring OU 7-10 Project operation- or position-specific qualifications or certifications will complete the necessary training before beginning their project activities. As appropriate, a qualified instructor or subject matter expert will conduct the training and document it in accordance with companywide procedures, or formal on-the-job training will be conducted in accordance with MCP-61, "Conduct and Evaluation of on-the-Job Training."

Table 6-1. Minimum required training for access to Operable Unit 7-10 Project operational areas.

Personnel and Operational Areas to be Accessed (unless specific positions are listed, minimum access requirements apply to all other operations personnel and visitors)	Shift Supervisor,[a] Operators, and Assigned Environment, Safety, and Health and Radiological Control Personnel	Project Support Areas[b]	General Weather Enclosure Structure Area Access	Overburden Buffer Area, Drum handling Areas, and Drum Preparation and Handling Area Access	Access to Contaminated or Potentially Contaminated Areas and Operations with Potential Significant Safety Hazards (e.g., Retrieval Confinement Structure, Packaging Glovebox System, and drum assay station)
Required Training					
40-hour HAZWOPER[c]—operations	Yes			d	**NO ACCESS without prior approval from OU 7-10 Project operations manager, Radiological Control, and IH Assigned project operations personnel only**
24-hour HAZWOPER[c]—operations			Yes[h]	d	
Project operations health and safety plan training[e]	Yes		Yes	Yes	
Project-site orientation briefing[f]		Yes			
Radiological Worker I or II[g]	RW II	Escort or RW I	Escort or RW I	RW II	
Respiratory protection	Yes				

Note: Shaded fields indicate specific training is not required or applicable.

a. Will be trained to the HAZWOPER supervisor level.

b. Project operational support areas located within the RWMC operations area may require additional training requirements such as Idaho National Engineering and Environmental Laboratory access (Blue Card) or RWMC access. Contact the OU 7-10 Project shift supervisor for additional training requirements.

c. Includes 8-hour HAZWOPER refresher training as applicable, and supervised field experience as follows:
40-hour HAZWOPER = 24-hour supervised field experience and 24-hour HAZWOPER = 8-hour supervised field experience.

d. 40-hour or 24-hour HAZWOPER training requirement will be determined by the assigned IH or safety professional based on the nature of the operational tasks and potential for exposure to contaminants or significant safety hazards.

e. Includes project-specific hazards communications (29 CFR 1910.120, 2002), site-access and security, decontamination and emergency response actions, as required by 29 CFR 1910.120(e) (2002), "Training."

f. Orientation includes briefing of site hazards, designated work areas, emergency response actions, and personal protective equipment requirements. Personnel receiving project-site orientation briefing only are limited to the areas outside designated work areas and must be escorted by a project supervisor or designee who is fully trained on the requirements of the health and safety plan.

g. Training requirements and allowances for escort into radiologically controlled areas are provided in Program Requirements Document-183. Source user training is required for personnel directly handling radioactive sources in accordance with Management Control Procedure-137.

h. Visitors on official business may be escorted by a fully trained employee into the general Weather Enclosure Structure area (Waste Management Facility-671) without 24- or 40-hour HAZWOPER training. Visitors must have prior authorization from the RWMC shift supervisor, and the facility operations must not present a risk of visitor exposure to potential contaminants of concern.

CFR = *Code of Federal Regulations*
HAZWOPER = Hazardous Waste Operations and Emergency Response
IH = industrial hygienist
OU = operable unit
RW = radiological worker
RWMC = Radioactive Waste Management Complex

6.5 Training Records

Training records for OU 7-10 Project personnel will be kept in accordance MCP-85, "Training Records Administration," by the project training organization. Documentation of a qualification or certification is placed in an employee's training file and maintained by the appropriate training organization. Employee experience and employment history records are maintained by the Human Resources organization in individual personnel files.

6.6 Project Operations-Specific Training

As part of OU 7-10 Project operations, training personnel will receive HASP training. After completing HASP training, project operations personnel will sign Form 361.25, "Group Read and Sign Training Roster," or equivalent computer-based training, indicating that they have received this training, understand the project tasks, associated hazards and mitigations, and agree to follow all HASP and other applicable work control and safety requirements. Form 361.25 (or equivalent) training forms are available on the INEEL Intranet under Forms.

A trained HAZWOPER 8-hour supervisor (shift supervisor or other person who has been trained by the HAZWOPER supervisor) will monitor the performance of each newly 24- or 40-hour trained worker to meet the 1 or 3 days of supervised field experience, respectively, in accordance with 29 CFR 1920.120(e), "Training." Following the supervised field experience period, the supervisor will complete Form 361.47, "Hazardous Waste Operations (HazWoper) Supervised Field Experience Verification," or equivalent, to document the supervised field experience.

Note 1: Supervised field experience is only required if personnel have not previously completed this training at another CERCLA (42 USC § 9601 et seq., 1980) site (documented), or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the OU 7-10 Project site as evidence of training or be available electronically in Training Records and Information Network (Training Records and Information System).

Note 2: Completed supervised field experience training forms (Form 361.47, or equivalent) should be submitted to the OU 7-10 Project training coordinator for inclusion in the Training Records and Information System.

6.7 Prejob and Postjob Briefings and Safety Meetings

All OU 7-10 Project operational activities performed in accordance with companywide requirement documents will require a prejob briefing conducted by a supervisor. During this briefing, tasks associated with OU 7-10 Project operations will be outlined, hazards identified, hazard controls and mitigation reviewed, PPE requirements discussed, waste minimization opportunities communicated, and employees' questions answered. Following the completion of operational activities, a post-job briefing will be conducted with particular emphasis of capturing lessons learned and process improvement for future operations.

Other safety meetings on various subjects will be conducted periodically for operations personnel to reinforce specific safety topics. A shift supervisor, assigned safety and health operations personnel or worker may conduct safety meeting. Attendance at the safety meetings will be documented on an applicable form and submitted to training personnel for entry into Training Records and Information System.

7. SITE CONTROL AND SECURITY

The OU 7-10 Glovebox Excavator Method Project operational areas will be fenced and controlled to prevent unauthorized entry into operations areas. Entry into and exit out of the OU 7-10 Project area will be controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes." Radiological controlled areas will be established by RadCon personnel, in accordance with the MCP-187, "Posting Radiological Control Areas."

Personnel not directly involved with OU 7-10 Project operations shall be excluded from entering the OU 7-10 Project operations area. The OU 7-10 Project operations area in the SDA will be posted and controlled as a CERCLA-regulated area. Visitors, such as inspectors, may be authorized to enter the established OU 7-10 Project operations area provided they are conducting official business and have met the minimum OU 7-10 Project operational training requirements for the area to be accessed (as listed on Table 6-1 and as posted). Nonoperational personnel will not be allowed access to active operational areas without processing through the OU 7-10 shift supervisor. All training for access into the requested area will be verified. Nonoperational personnel will only be allowed into operational areas to perform the specific function for which access was granted and may be limited in these areas because of operational activities and associated hazards (at the discretion of the shift supervisor).

The general configuration of the OU 7-10 Project operations area is illustrated in Figure 1-3. Individual OU 7-10 Project building and project complex drawings will be drafted as construction is completed.

7.1 Radiological Confinement Zones

For ventilation design purposes, areas of the WMF-671 WES and associated confinements are classified as Confinement (pressure) Zones of Clean Area, I, II, or III in accordance with criteria in DOE-ID "Architectural Engineering Standards." A Confinement Zone III classification applies to areas where highly radioactive materials are handled. A Confinement Zone II classification applies to areas where high levels of radioactive contamination could be present. A Confinement Zone I classification is assigned to operating areas and maintenance areas that are next to Zone II and III areas, and a classification of Clean Area is assigned to areas that normally are free of contamination. Training requirements for access to these general areas is provided on Table 6-1. The following list describes each of the confinements and their confinement zone classification:

- Packaging glovebox system gloveboxes — Zone III
- Retrieval confinement structure — Zone III
- Personnel access vestibule — Zone I
- Drum loadout enclosures — Zone II
- Transfer area — Zone I
- Weather enclosure structure — Zone I
- Personnel monitoring room — Clean Area.

7.2 Radiologically Contaminated Material Release

If project equipment or materials become radiologically contaminated within these radiological confinement zones, they will not be released until required radiological surveys have been completed (e.g., hand-held instruments and swipes) in accordance with MCP-139, "Radiological Surveys," MCP-425,"Radiological Release Surveys, and the Disposition of Contaminated Materials," as stated in the RWP, and as directed by RadCon personnel.

7.3 Site Security

The OU 7-10 Project is secured and controlled with the existing RWMC and the Lockheed Martin Advanced Environmental Systems fence and through appropriate posting to prevent entry into OU 7-10 Project operational areas. Additionally, INEEL security forces will provide general facility security in conjunction with RWMC operations.

Note: Signs are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.

7.4 Wash Facilities and Sanitation

Project operations, such as waste handling, storage, PGS operations, and sampling will involve close contact with waste and other potentially contaminated surfaces. Personnel will obey all radiological survey requirements to prevent inadvertent uptakes of radiological or chemical contaminants. Ingestion of hazardous substances is more likely when workers do not practice good personal hygiene habits during and following activities in the operations areas of the project. It is important to wash hands, face, and other exposed skin areas thoroughly after completion of work and before smoking, eating, or chewing gum or tobacco.

Sanitation and shower facilities will be available for OU 7-10 Project operations personnel within RWMC facility areas.

Note: No smoking, chewing, eating, or applying lip balm is allowed within CERCLA-regulated areas and radiologically controlled areas. A designated drinking area may be established in the WMF-671 WES for heat stress prevention in accordance with IH and RadCon Foreman review and restrictions.

7.5 Designated Eating Areas and Smoking Area

The designated eating areas for operations personnel will be established in the OU 7-10 Project operations areas and also will include the RWMC cafeteria (located in WMF-637) and designated eating areas.

Smoking will only be permitted in designated smoking areas outside the OU 7-10 Project CERCLA-regulated areas. Personnel will comply with all INEEL smoking polices, including disposal of smoking materials in the proper receptacles. All Guide-7063, "INEEL Wildland Fire Management Guide," requirements related to smoking at the INEEL will be practiced.

8. OCCUPATIONAL MEDICAL SURVEILLANCE

The OU 7-10 Glovebox Excavator Method Project operations personnel shall participate in the INEEL OMP, defined in Program Description Document -61, "Occupational Health Program," to implement the requirements of DOE Order 440.1A (1998), "Worker Protection Management for DOE Federal and Contractor Employees"; DOE Order 440.1-4 (1998), "Contractor Occupational Medical Program"; and 29 CFR 1910.120(f) (2002). Medical surveillance examinations will be provided at the following times:

- Before assignment
- At least once every 12 months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is acceptable
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary
- Personnel who are or may be exposed to hazardous substances at or above the OSHA PEL, or published exposure limits, without regard to respirator use for 30 or more days per year
- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation
- All employees who wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134 (2002), "Respiratory Protection."

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by MCP-2726.

If the OMP does not have sufficient information to complete a medical evaluation before respirator training, the employee's supervisor will be notified. The employee will not be permitted to fit test until the needed information is provided and any additional examination or testing is completed.

A single copy of the OU 7-10 Project HASP, job hazard analysis requirements, required PPE, and other exposure-related information will be made available, upon request, to the INEEL OMP physician (and subcontractor physicians) conducting medical surveillance for employees participating in project operations. Exposure monitoring results and hazard information furnished to the OMP physician will be supplemented or updated annually if required (as stated in Section 12) as long as the employee is required to maintain a hazardous waste and material employee medical clearance. The OMP physician will then evaluate the physical ability of an employee to perform the work assigned.

The OMP physician shall evaluate the physical ability of OU 7-10 Project operations personnel to perform the work assigned, as identified in this HASP, other project facility-related documentation, and individual training plans. A documented medical clearance (e.g., a physician's written opinion) will be provided to the employee and supervisor stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from project operations,

emergency response operations, respirator use, and radiological work, as applicable. The OMP responsibilities, with regard to personnel assigned to project operations include, but are not limited to, the following:

- Providing current comprehensive medical examinations (as determined by the examining physician) at an INEEL medical facility for full-time project operations personnel
- Obtaining records or reports from an employee's private physicians, as required by the OMP director
- Performing a medical evaluation on return-to-work cases following an absence in excess of one work week (40 consecutive work hours) resulting from illness or injury
- Conducting a medical evaluation in the event that management questions the ability of an employee to work or if an employee questions his or her own ability to work.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the MCP-3003 prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the responsibility of each employee to inform the supervisor of any work or medical restrictions.

Note: All managers, supervisors, and foremen have access to employees' current medical restrictions, certifications and surveillances through the OMP database on the Safety and Health homepage or OMP reports link: http://webhome4/OMPReports/. This allows management to review medical restrictions, surveillances, and certifications before assigning work tasks to employees.

8.1 Project Operations Subcontractor Workers

If subcontractors participate in OU 7-10 Project operations or may be exposed to OU 7-10 Project operational hazardous substances or health hazards at or above the established permissible exposure limit for these substances without regard to the use of respirators for 30 days or more a year, they shall participate in a subcontractor medical surveillance program that satisfies the requirements of 29 CFR 1910.120(f) (2002). The physician's written opinion will serve as documentation that subcontractor personnel are fit for duty.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, shall be made available to the INEEL OMP physicians, upon request. A subcontractor employee's past radiation exposure history may be requested and, if so, will be submitted to the INEEL radiation dosimetry and records section, in accordance with MCP-188, "Issuance of Thermoluminescent Dosimeters and Obtaining Employees Dose History," and MCP-2381, "Employees Exposure Questionnaire," of the *INEEL Radiation Protection Manual.*

8.2 Injuries at the Operable Unit 7-10 Project Site

It is the policy of the INEEL that an INEEL OMP physician examines all injured personnel for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material

- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

Note: In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility or whether to immediately request an ambulance and continue to stabilize and provide first aid should be based on the nature of the injury or illness and likelihood that transporting the individual may cause further injury or harm. Most likely, the person making this decision will only be trained to the medic first or CPR level and should contact the CFA medical facility at 777 or 526-1515 for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.

In the event of a known or suspected injury or illness caused by exposure to a hazardous substance or physical or radiological agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment. The shift supervisor is responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work location, and supervisor's name and phone number
- Substance, physical or radiological agent exposed to (known or suspected), and material safety datasheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120 (2002).

Note: In the event of an illness or injury to a subcontractor employee, the employee will be transported to the nearest INEEL medical facility (CFA-1612) as appropriate based on injury severity to have the injury stabilized. The employee will then be transported to the subcontractor's treating physician or off-Site medical facility.

The OU 7-10 Project shift supervisor will be contacted if any injury or illness occurs to personnel working for the OU 7-10 Project. As soon as possible after an injured employee has been transported to the INEEL medical facility, the shift supervisor or designee will make additional notifications listed in Section 10.

Radiological Control personnel will evaluate all actual and suspected radiological exposures in excess of allowable limits and will establish follow-up actions. For internal uptakes (as calculated committed effective dose equivalent values), the "Established Levels of Radionuclide Intake for Consideration of Medical Intervention" (EDF-INEL-003) will be used as the basis for this evaluation and follow-up actions. All wounds will be examined by an OMP physician to determine the nature and extent of the injury. The RadCon supervisor in conjunction with an OMP physician will determine whether the

wound can be bandaged adequately for entry into a radiological contamination area in accordance with Article 542 of the RCM (PRD-183).

8.3 Substance-Specific Medical Surveillance

Project operations will involve the excavation, handling, sampling, packaging, and storage of OU 7-10 waste contaminated with radiological and chemical constituents (see Tables 2-2 and 2-3). Several of the nonradiological waste constituents have OSHA substance-specific standards that govern the manner that personnel monitoring and medical surveillance are conducted. These substances have exposure action levels (see Table 2-4) that trigger medical surveillance requirements. Based on the facility safety design features and engineering controls (e.g., confinement, barriers, and negatively pressured HEPA-filtered ventilation system) for control of radiological and nonradiological constituents, exposure levels for work inside the WMF-671 WES at the excavator RCS and PGS operator positions are not anticipated to reach these action levels. Additionally, the DSS will be employed to minimize particulate generation in the RCS, thus, further reducing the potential for exposures.

Protective clothing and respiratory protection will be worn for personnel required to enter the RCS or contaminated PGS systems to perform preventive or unscheduled maintenance tasks. These tasks are not anticipated to be routine in nature and if entry into airborne radioactivity areas, supplied air respiratory protection will be worn. Based on the engineering controls, the limited nature of potential exposures, and the level of protective equipment that will be worn, exposures are anticipated to be nominal.

All OU 7-10 Project operations will be evaluated to determine the hazards and potential exposures to operations personnel in accordance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control." The IH and RadCon personnel will conduct exposure assessments for each operation to determine the potential for exceeding exposure limits. The regulatory requirements for each OSHA-mandated substance-specific standard will be reviewed against exposure monitoring data (where available) and in the context of the exposure potential using professional judgment. If OU 7-10 Project operations involving chemicals listed in 29 CFR 1910.1003 (2002), "13 Carcinogens," and MCP-2703, "Carcinogens," will be followed.

All exposures to ionizing radiation will be evaluated in accordance with the RCM and, where deemed appropriate, be controlled through the use of an RWP in accordance with MCP-7, "Radiological Work Permit."

If new OU 7-10 Project waste forms or streams are identified or operational chemicals are introduced during the course of operations, then exposures will be evaluated and quantified to determine if a substance-specific standard applies. If regulatory mandated substance-specific standard action levels are triggered, then affected personnel will be enrolled in applicable substance-specific medical surveillance programs.

9. PERSONNEL ROLES AND RESPONSIBILITIES

The organizational structure for OU 7-10 Glovebox Excavator Method Project operations reflects the resources and expertise required to operate the facility while minimizing risks to worker health and safety, the environment, and the general public. Job titles of the individuals in key roles at the OU 7-10 Project operational facilities are shown on the organizational chart in Figure 9-1. The operations organization includes project operations management and supervision; operators and technicians; environment, safety, health, and quality assurance representatives; and support personnel. The OU 7-10 Project NFM and the operations manager will interface to determine the most appropriate use of these resources.

The emergency organization structure with both responsibilities and authorities at RWMC is contained in the *INEEL Emergency Plan/RCRA Contingency Plan*, Addendum 3 (PLN-114-3). Section 9 outlines the responsibilities of key OU 7-10 Project personnel.

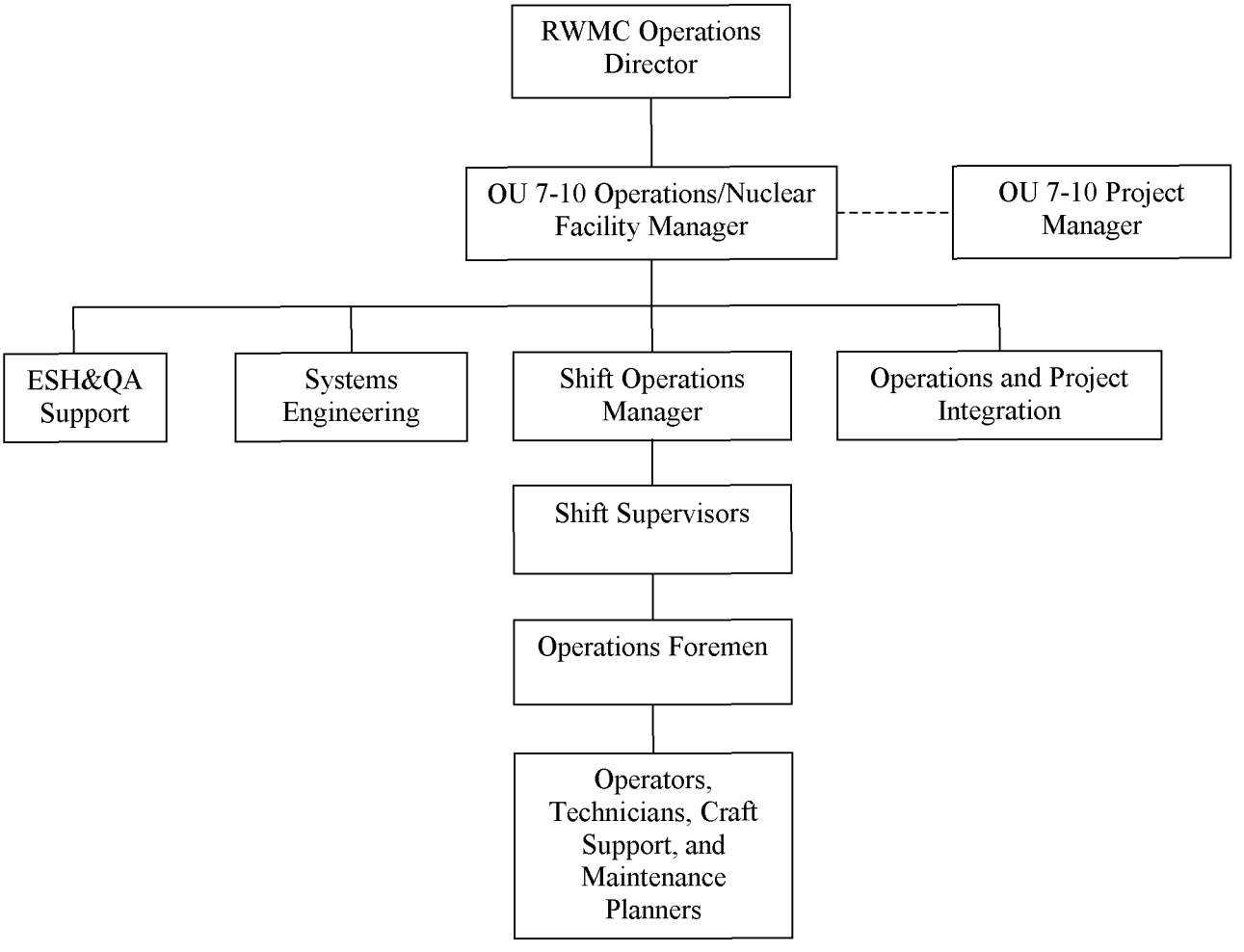


Figure 9-1. Operations organizational interfaces for the Operable Unit 7-10 Glovebox Excavator Method Project.

9.1 Project Operations Personnel

9.1.1 Project Operations Management

9.1.1.1 Radioactive Waste Management Complex Operations Director. Because construction, operations, and D&D&D activities for the OU 7-10 Project will occur within the RWMC operations boundary, the RWMC operations director will serve as the operations director for all OU 7-10 Project operations. The RWMC operations director will ensure that documents identified within the RWMC authorization basis (i.e., RWMC safety analysis report, technical safety requirement, and permits) remain current and adequately address the scope and hazards encountered for activities within the scope of RWMC operations.

The RWMC operations director will provide infrastructure programs to support facility safety and work processes for personnel assigned to the OU 7-10 Project area. These programs include supplying support services (e.g., maintenance craft skills, RadCon personnel, and engineering support), equipment (e.g., forklifts and water trucks), and document control and records management functions. The RWMC operations director also establishes and staffs an Emergency Response Organization (ERO), which includes developing site-specific emergency plans and maintaining a command post and support equipment.

9.1.1.2 Project Operations and Nuclear Facility Manager. The OU 7-10 Project NFM is responsible to the RWMC operations director for all OU 7-10 area operational activities and supports the project through the project manager as the work package manager for startup, operations, and maintenance activities related to OU 7-10 Project scope, schedule, and budget performance. The NFM is responsible for the safe operation of OU 7-10 Project equipment and facilities and for ensuring that safety systems protect human health and the environment.

9.1.1.3 Shift Operations Manager. The shift operations manager is responsible for the day-to-day operational activities of the OU 7-10 Project and is the designated NFM alternate, with signature authority for all matters regarding operations and nuclear facility management. Specific duties and responsibilities include directing performance of operational activities in accordance with the approved schedule, communicating expectations to the crews, assessing their readiness to perform work in a manner consistent with all applicable safety and health requirements and company procedures, and managing the operational shift crews.

9.1.2 Shift Operations

9.1.2.1 Shift Supervisor. The shift supervisor is the individual responsible on-shift during OU 7-10 Project operations, and has authority to act for management during normal and abnormal operations. Specific duties and responsibilities include ensuring the safe and efficient execution of work for waste retrieval, segregation, handling, and storage, and ensuring conduct of operations is performed in such a way as to protect human health and the environment.

9.1.2.2 Operations Foremen. Operations foremen are responsible for on-shift waste handling operations and maintenance activities and for reporting to the RWMC shift supervisor. He or she ensures the efficient execution of work within the WMF-671 WES and ensures conduct of operations is performed safely and protective of human health and the environment.

9.1.2.3 Operators (Retrieval, Soil Handling, and Material Handling). Operators are assigned to each shift to perform retrieval, soil handling, and glovebox operations. Operators will be fully qualified

to perform their prescribed duties. In addition, a roving operator is assigned to assist with drum-out operations and fissile monitoring, and will support these activities as required.

9.1.2.4 Data Recorder. The data recorder will assist with the identification and characterization of waste in the PGS, records data, enters data into the drum tracking system and, when required, acts as a verifier of waste disposition locations.

9.1.2.5 Laborers and Heavy Equipment Operators. Specific duties and responsibilities include operating the excavator, forklifts, and flatbed to transport drums, handling the drums within the secondary confinement area, and understanding and applying OU 7-10 Project-specific safety and health policies.

9.1.2.6 System Engineers (Shift Technical Advisor). System engineers are responsible to the operations manager and the NFM and will receive day-to-day direction through the lead system engineer. Specific duties and responsibilities include the following:

- Verifying that all proposed design changes meet all applicable requirements
- Establishing and maintaining technical baselines
- Managing the engineering change control process
- Implementing configuration management for each structures, systems, and components for which the system engineer is or will be responsible.

9.1.2.7 Radiological Control Technicians. Radiological control technicians report directly to the facility RCT foreman, and are responsible for ensuring compliance with the INEEL RadCon program within the OU 7-10 Project, including acting as a RadCon information resource for project personnel. Also, during emergencies, RCTs are responsible for stopping work or ordering an area evacuated when an imminent radiation hazard exists and such actions are necessary to ensure worker safety.

9.1.2.8 Radiological Control Technician Foreman. Specific duties and responsibilities of the RCT foreman include directing and supervising day-to-day activities for RCTs, reviewing radiological work permits, and ensuring that requirements of applicable DOE orders, company programs, and the RCM are properly incorporated into project-specific procedures, practices, and controls

9.1.2.9 Mechanics and Instrument Technicians. Maintenance personnel are responsible for maintenance and repair of project operations mechanical and electrical equipment. Personnel in this category include all maintenance crafts, Life Safety Systems technicians, and their line management. Technicians are responsible for specific maintenance and monitoring activities that include equipment maintenance, troubleshooting, repair, testing, instrument calibration, inspections, and data surveys.

9.1.3 Environment, Safety, Health, and Quality Assurance

9.1.3.1 Radiological Engineer. The radiological engineer provides radiological engineering support within the project. Specific duties and responsibilities include acting as point of contact for all radiation protection issues related to the project, ensuring that radiological hazards are identified and appropriate controls are implemented to maintain worker exposure to those hazards ALARA, and identifying conditions that may impede implementation of company standards for safety, quality, and operations and maintenance. The radiological engineer is also responsible for initiating actions to correct

conditions, including stopping work if necessary, that adversely impact safety, quality, or operations and maintenance.

9.1.3.2 Environmental Engineer. Responsibilities of the environmental engineer include providing overall technical expertise with respect to regulatory issues, natural and cultural resources, and risk assessment for the OU 7-10 Project. The Environmental Engineer identifies environmental and regulatory issues that affect operations and develops solutions in coordination with the OU 7-10 Project engineer and other project task leads. The Environmental Engineer also works with the project task leads and management to develop appropriate mitigation measures that minimize potential noncompliance with environmental requirements when environmental issues are identified.

9.1.3.3 Safety Professional. The assigned INEEL safety professional reviews work packages, observes operational activities, assesses compliance with the INEEL safety and health manuals, signs SWPs, advises the shift supervisor on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise during operations. The safety professional may conduct periodic inspections in accordance with MCP-3449, "Safety and Health Inspections," and may have other duties at the task site as specified in other sections of this HASP, or in INEEL PRDs or MCPs. Additionally, the safety professional will support OU 7-10 facility and project management by investigating accidents and injuries and preparing written reports to project and facility management related to hazard identification and appropriate mitigation efforts.

9.1.3.4 Industrial Hygienist. The assigned INEEL IH is the primary source for information about nonradiological hazardous and toxic agents during operations. The IH assesses the potential for worker exposures to hazardous agents in accordance with the INEEL safety and health manual MCPs, and accepted industry IH practices and protocol. By participating in work control development and approval process, the IH assesses and recommends appropriate hazard controls for the protection of operations personnel, operates and maintains airborne sampling and monitoring equipment, reviews for effectiveness, and recommends and assesses the use of PPE required in this HASP (recommending changes as appropriate to facility management).

9.1.3.5 Quality Assurance Engineer. Duties and responsibilities of the quality assurance engineer include implementing internal quality monitoring, assessment, and surveillance by establishing and maintaining an internal assessment and monitoring schedule; reviewing design and performance specifications and other design documents to determine if quality requirements are properly included; and ensuring quality assurance compliance is achieved in accordance with applicable requirements established by the company, DOE, state, and federal regulations.

9.1.4 Operations Support

9.1.4.1 Operations Integration Specialist. Specific duties and responsibilities of the operations integration specialist include interfacing between operations and all other project teams (e.g., project management, design, safety, and health, environmental, criticality protection, radiological controls, records management, and document control) to help ensure that operations is informed of requirements that impact operational activities; the underlying driver for all requirements impacting operational activities is known and understood; and OU 7-10 Project deliverables that are not created by operations, but impact operation's documents and responsibilities, are coordinated and scheduled for delivery in time to support operational deadlines.

9.1.4.2 Safety Analyst. The safety analyst performs nuclear safety analyses and prepares and maintains the nuclear safety analysis documents required by 10 CFR 830 Subpart B, "Safety Basis Requirements." Specific duties and responsibilities include acting as the point of contact for safety

analysis issues related to the OU 7-10 Project, scheduling and tracking of safety analysis work, preparation and maintenance of documented safety analyses and technical safety analysis requirements, and preparation of unreviewed safety question screens and evaluations.

9.1.4.3 Waste Generator Services Facility Representative and Technical Specialist. Duties and responsibilities of the Waste Generator Services facility representative and technical specialist include the following:

- Collaborating with project personnel to complete initial evaluation of waste types generated as part of process operations
- Assigning a probable waste type
- Maintaining the waste management records in the INEEL Integrated Waste Tracking System database
- Meeting with the waste generator to obtain and document the following information:
  - Identification of the waste generation process, schedule, and potential pollution prevention opportunities
  - Identification of starting materials for the waste generation process
  - Definition of the expected waste material components and characteristics and all process knowledge data.

The Waste Generator Services facility representative and technical specialist assumes cradle-to-grave responsibilities for a given waste stream and ensures that all activities in this process are completed.

9.1.4.4 Radioactive Waste Management Complex Classification Officer and Security Personnel. The RWMC security personnel provide facility security, review procedures and plans before waste retrieval or relocation, and address security concerns expressed by OU 7-10 Project personnel. In addition, these personnel conduct damage assessments in the event of a security incident, coordinate with DOE-ID Security and the Classification Officer, and identify any added security measures required.

9.1.4.5 Training Specialist. Duties and responsibilities include supporting line management through training analysis, design, development, implementation, and evaluation to ensure all personnel on the OU 7-10 Project are properly trained and qualified to perform their assigned tasks.

9.1.4.6 Administrative Support. Administrative support and office personnel are responsible for support functions that do not involve actual facility operations. Activities performed, such as word processing, filing, stocking office supplies, and answering the phone, are performed exclusively in an office environment.

9.1.5 Visitors

All visitors with official business in the OU 7-10 Project operational areas (including INEEL personnel, representatives of DOE, and state or federal regulatory agencies) may not proceed into the WMF-671 WES without having the appropriate training (see Table 6-1) as described below:

- Receiving OU 7-10 Project operational-specific briefing for the operations area to be accessed

- Signing applicable entry logs and work control documents (for the area to be accessed)
- Wearing the appropriate PPE.

A fully trained OU 7-10 Project operations representative (e.g., shift supervisor or operator) will escort visitors entering the project operational areas.

Note 1: Visitors may not be allowed into the WMF-671 WES during certain operations to minimize safety, health and radiological hazards to the visitor(s). The determination as to any visitor's demonstrated need for access into the OU 7-10 Project operational area will be made by the shift supervisor in consultation with RadCon personnel and assigned safety and health professionals.

Note 2: Visitors with no official business at project operations areas will not be permitted.

10. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of OU 7-10 Project operations personnel during an emergency. Such an emergency could be within OU 7-10 Project operations area, at the RWMC, or a Site-wide emergency. This section provides emergency plan contingencies at a project level and is a HAZWOPER-mandated supplemental plan to the "INEEL Emergency Plan RCRA Contingency Plan" (PLN-114) information. Plan-114 describes the overall process developed to respond to and mitigate consequences of emergencies that might arise at the INEEL. This section defines the responsibilities of OU 7-10 operations personnel and their interface with the INEEL ERO by providing guidance for responding to abnormal events during project operational activities.

Plan-114 may be activated in response to events occurring at the RWMC, at the OU 7-10 Project complex, or at the discretion of the emergency coordinator. Once the INEEL plan is activated, OU 7-10 Project operations personnel will follow the direction and guidance communicated by the emergency coordinator.

Note: The OSHA HAZWOPER definition of an emergency is not defined the same as in DOE Orders 151.1A (2000), "Comprehensive Emergency Management System," and 232.1 (1997), "Occurrence Reporting and Processing of Operations Information." For this reason, the term event will be used in this section when referring to project operational HAZWOPER emergencies.

10.1 Preemergency Planning

The INEEL Emergency Plan RCRA Contingency Plan provides the basis for preplanning all INEEL emergency events. This base plan is supplemented with INEEL facility-specific addendums. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect operational activities. Preplanning also ensures that this project operations emergency response plan (Section 10) is integrated with the INEEL and RWMC emergency response programs. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency implementing procedures. Finally, this HASP addresses operational-specific hazards, potential emergency events, and the protective actions to take following such events. Emergency response program planning elements that must be completed before the initiation of project operations include the following:

- Establishing emergency warning signals and evacuation routes
- Establishing effective site communications
- Establishing requirements for emergency equipment and supplies
- Implementing personnel accountability procedures
- Identifying an adequate number of CPR and medic first-aid trained personnel
- Establishing the preferred means for notifying the INEEL ERO of abnormal events.

Note: All OU 7-10 Project operational emergencies will be reported through the RWMC shift supervisor to the ERO for classification in accordance with Section 4 of PLN-114. If the RWMC ERO is activated, site emergency response will follow PLN-114, RWMC Addendum 3 (PLN-114-3).

10.2 Emergency Preparation and Recognition

The HASP sections for hazards identification and mitigation (Section 2) and accident prevention (Section 4) provided the strategy that will be followed at OU 7-10 Project operational areas to prevent accidents. Similarly, emergency preparation and recognition also will require operations personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All OU 7-10 Project operations personnel should be familiar with the techniques for hazard recognition and the associated response including proper operational notifications. Emergency phone numbers and evacuation route maps will be located throughout project operational areas.

Preparation and training on emergencies will include proper project access and egress procedures in response to project operational events and INEEL emergencies as part of the HASP training and project operations area access training where applicable. Visitors also will receive a briefing on emergency procedures during the hazard and general operations orientation briefing (see Table 6-1) and potentially complete HASP training depending on the project operations area to be accessed. Visitor emergency actions briefing will include, alarm identification, location and use of communication equipment, location of Site emergency equipment, and evacuation.

On-scene response to and mitigation of operational emergencies could require the expertise of INEEL fire department and medical personnel. Emergencies that could occur include the following:

- Accidents resulting in injury
- Fires
- Spills of hazardous or radiological materials
- Tornadoes, earthquakes, and other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

10.3 Emergency Facilities and Equipment

Emergency response equipment, including the items described in Table 10-1, will be maintained within the OU 7-10 Project operations area. The RWMC PLN-114 Addendum 3 (PLN-114-3) lists emergency equipment available at RWMC. This includes the emergency coordinator located in WMF-637 and equipment located in WMF-601 at RWMC. Additional heavy construction and other equipment listed in PLN-114-3 are available for use during emergencies.

The INEEL fire department maintains an emergency HAZMAT response van that can be used to respond to an event or emergency within the project operations areas. Fire department personnel also are trained to provide immediate hazardous material spills and medical services. Additionally, the CFA-1612 medical facility is manned by medical personnel to evaluate and stabilize injured personnel or those experiencing signs and symptoms of exposure. At least two individuals with current medic and first-aid training will be present within the OU 7-10 Project operations area during active operations.

Table 10-1. Emergency response equipment to be maintained at the Operable Unit 7-10 Project site during operations.

Equipment Name and Quantity Required	Location at Operable Unit 7-10 Project	Responsible Person	Frequency of Inspection
Fire extinguishers[a]	Located throughout the operations area, administration buildings, the WMF-671 WES, outside RCS and Packaging Glovebox System, in each waste storage area, and on each piece of industrial and heavy equipment and in each vehicle	Operations manager	Monthly
First aid supplies	Vehicles, designated administrative trailers, and within the WMF-671 WES	Operations manager	Inspect weekly and sign tag with annual inspection
Eye wash station	At designated operational areas where chemical mixing or use occurs and where there is a significant eye hazard (as determined by the IH and Safety professional)	Operations manager	Monthly or the frequency determined by the manufacturer
Eye wash bottle[b]	At strategic locations throughout the WMF-671 WES as determined by the IH and safety professional	Operations manager	Monthly or replace after use
Hazardous materials spill kit	Within the WMF-671 WES and staged absorbent material in the RCS during excavation activities for liquid absorption (RCS absorption of liquids not considered a spill as described in Section 10.5.2.2)	Operations manager	Monthly
Communication equipment available	In all operational areas or in possession of key operations personnel	Operations manager	Availability and daily functional check

a. 10A or 60BC extinguishers or as specified by the Radioactive Waste Management Complex fire protection engineer.
b. An eye wash bottle will be used to provide an immediate eye flush if required. Portable eye wash stations that meet the ANSI Z 358.1-1998 (1998) requirement are available at the WMF-671 WES and other locations as determined by the IH and safety professional. Employees are instructed to use the bottles and immediately proceed to the decontamination and treatment facility permanent eye wash station. Eye wash stations will be located within 100-ft or 10 seconds from significant eye hazard operations as determined by the IH and safety professional.

IH = industrial hygienist
RCS = Retrieval Confinement Structure
WES = Weather Enclosure Structure
WMF = Waste Management Facility

10.4 Emergency Communications

In the event of an emergency, capability to perform the following actions is required:

- Summon INEEL emergency response resources
- Immediately notify operations personnel
- Inform others of the emergency.

Communications equipment within the OU 7-10 Project operations areas will include a combination of radios, telephones (i.e., mobile, cellular, or hardline), and pagers. The OU 7-10 shift supervisor will be notified of any project emergency event and the shift supervisor will then make the required RWMC shift supervisor and INEEL ERO notifications.

10.4.1 Notifications

During emergency situations, the OU 7-10 shift supervisor will be notified of any operational emergency event. The OU 7-10 shift supervisor will then notify the RWMC shift supervisor who will make the required ERO and Warning Communications Center (WCC) notifications. The following information should be communicated, as available, to the RWMC shift supervisor:

- The caller's name, title (e.g., OU 7-10 shift supervisor), telephone number, and pager number
- Exact location of the emergency
- Nature of the emergency including time of occurrence, current site conditions, and special hazards in the area
- Injuries, if any, including numbers of injured, types of injuries, and conditions of the injured personnel
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

Note: If the OU 7-10 shift supervisor or RWMC shift supervisor cannot be contacted, then the WCC will be notified of the emergency event, and the information listed above will be communicated. The WCC also must be told that notification to the RWMC shift supervisor and emergency coordinator has not been made.

10.5 Personnel Roles, Lines of Authority, and Training

10.5.1 Idaho National Engineering and Environmental Laboratory Emergency Response Organization

The INEEL ERO structures are based on the incident command system and are described in PLN-114 and facility-specific addendums to that plan.

10.5.2 Role of Operations Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. The OU 7-10 shift supervisor and operations personnel responsibilities are described in Sections 10.5.2.1 and 10.5.2.2. Operations personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel are trained to the OU 7-10 operations and RWMC-specific emergency actions as part of the access training or will be escorted by someone who has been trained. Emergency response actions also will be covered as part of the HASP briefing.

10.5.2.1 Operable Unit 7-10 Shift Supervisor. The OU 7-10 Project operations shift supervisor is responsible for initiating all requests for emergency services (e.g., fire and medical) and for notifying the RWMC shift supervisor of abnormal or potential abnormal events occurring within the project operations area. In addition, the shift supervisor or trained alternate will serve as the area warden. The area warden is responsible for conducting personnel accountability for all operations areas. This will be accomplished by

completing positive sweeps of all OU 7-10 Project buildings and areas to ensure personnel are aware of the emergency event. Following notification of the emergency event, operations personnel will be directed to the designated assembly point where the attendance log (or equivalent) will be used to determine what personnel are onsite (role call). The OU 7-10 shift supervisor then will report accountability status to the RWMC shift supervisor, who will in turn, initiate communicate this information to the RWMC emergency coordinator.

Additionally, the OU 7-10 shift supervisor will control the scene of any emergency event (from a safe distance) until a member of the Incident Command System authority arrives at the scene to take control as the on-scene commander. When communicating emergency information to the on-scene commander, the OU 7-10 shift supervisor will provide all requested information about the nature of the event, potential hazards, and other information requested by the on-scene commander.

10.5.2.2 Operable Unit 7-10 Project Operations Assigned Personnel. Every person within the project operations area during an operations emergency event or INEEL emergency has a role to play. Personnel must be constantly aware of potential problems or unexpected hazardous situations and immediately report these situations to the OU 7-10 shift supervisor. All personnel are expected to assist with accountability when required, to report near misses and emergency events of concern to the OU 7-10 shift supervisor, and to respond to emergency events, as provided for in this HASP. Specific facility personnel responsibilities are outlined in Table 10-2.

Table 10-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Any OU 7-10 Project worker	Contact the OU 7-10 shift supervisor
Any fire-extinguisher-trained worker	Extinguish fires (incipient fires only) or contain spills (within level of training)
Any medic first aid and CPR-trained personnel	Provide first aid within level of training (on a voluntary basis)
Shift supervisor or designee	Contact the RWMC shift technical lead or emergency coordinator (if emergency coordinator has formed)
Shift supervisor or designee	Contact the INEEL site emergency telephone number or the Warning Communications Center (if RWMC shift technical lead cannot be contacted)
Shift supervisor or trained designee	Conduct personnel accountability and report information to the RWMC shift technical lead or emergency coordinator
Shift supervisor or designee	Report incipient fires to the INEEL fire department Report spills to the INEEL spill notification team
Shift supervisor	Report occupational injuries or illnesses to the Occupational Medical Program

CPR = cardiopulmonary resuscitation
INEEL = Idaho National Engineering and Environmental Laboratory
OU = operable unit
RWMC = Radioactive Waste Management Complex

10.5.2.3 Personnel Accountability and Area Warden. The OU 7-10 project operations personnel are required to TAKE COVER within the project area or may be required to evacuate the project operations area or RWMC in response to an EVACUATION. In each case, the OU 7-10 shift supervisor or trained alternate shall account for the people present within the operations area. The shift supervisor or trained alternate will serve as the area warden for OU 7-10 Project operations and complete

the personnel accountability (following positive sweeps of OU 7-10 buildings and areas). The results of this accountability will then be reported to the RWMC shift supervisor or emergency coordinator (if the emergency coordinator has been formed).

10.5.2.4 Spills. If the material spilled is known and is small enough to be safely contained, project operations personnel will handle spill control within their level of training (as described in Sections 10.5.2.4.1 and 10.5.2.4.2) using spill supplies in the project operational area. The spill will be immediately reported the to the OU 7-10 shift supervisor or RWMC shift supervisor (if the OU 7-10 shift supervisor cannot be contacted). Reporting requirements will be determined by the RWMC emergency coordinator in accordance with MCP-190, "Event Investigation and Occurrence Reporting." If any release of a hazardous material occurs, task site personnel will comply with the following immediate spill response actions.

10.5.2.4.1 Untrained Initial Responder—The requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration (as applicable)
- **Evacuate** and **isolate** the immediate area
- Notify and then **seek help** from and **warn** others in the area
- Notify the OU 7-10 shift supervisor.

10.5.2.4.2 Trained Responder—The requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:

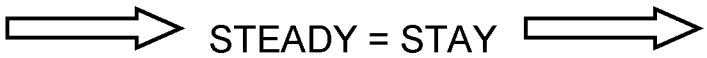
- Place all equipment in a secure configuration (as applicable)
- **Seek help** from and **warn** others in the area
- **Stop** the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- **Provide** pertinent information to the OU 7-10 shift supervisor
- **Secure** any release paths if safe to do so.

10.6 Emergency Alerting, Responses, and Sheltering

10.6.1 Alarms

Alarms and signals are used at the OU 7-10 Project and the INEEL to notify personnel of abnormal conditions requiring a specific response. These include radiation-monitoring alarms denoted by fast ringing bells and fire alarms that may vary from building to building within the RWMC and OU 7-10 Project operational areas. Responses to these alarms are addressed in the general employee and site-access training for environment, safety, and health employees. In addition to these alarms, emergency sirens located throughout the RWMC serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions.

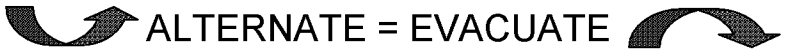
10.6.1.1 Take Cover—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN. The order to TAKE COVER is usually announced by activating the RWMC emergency siren.



TAKE COVER also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, OU 7-10 Project operations personnel will place project operations equipment in a safe configuration (as applicable) and then seek shelter in project operations or administrative buildings (if outdoors). Eating, drinking, and smoking are not permitted during take-cover conditions.

Radiological control personnel will assist and direct all workers exiting from radiological contamination areas during a TAKE COVER alarm.

10.6.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the entire project operations and RWMC area. The evacuation signal is an ALTERNATING SIREN.



When ordered to EVACUATE, operations personnel will place project operations equipment in a safe configuration (as applicable) and then proceed along the specified evacuation route to the designated assembly area or as directed by the emergency coordinator. For total area evacuations, the RWMC command post is activated and all personnel will gather at the primary RWMC evacuation assembly area or the location designated by the emergency coordinator. The shift supervisor or trained alternate will then complete the personnel accountability and report the result of the accountability process to the RWMC emergency coordinator. Radiological Control personnel will assist and direct all workers exiting from radionuclide-contamination areas during an EVACUATION alarm. Eating, drinking, and smoking are not permitted during emergency evacuations.

10.3.1.3 Local Area (Operable Unit 7-10 Project Operations Area) Evacuation. A local area evacuation is the complete withdrawal of personnel from a portion of or all OU 7-10 Project operational areas, but it does not necessarily require the complete evacuation of the entire RWMC. An example would be if a CAM alarmed within the WMF-671 WES. This alarm will serve as the primary emergency evacuation signal for personnel in the WMF-671 WES area. The order to evacuate OU -710 Project operational areas also can be given by word of mouth, radio, or voice paging system. When ordered to evacuate the project operational area, personnel shall place the project operations equipment in a safe condition (as applicable) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations, or as directed by the OU 7-10 shift supervisor. (Emergency evacuation routes for each project building will be developed and posted following construction.) The OU 7-10 shift supervisor will then conduct personnel accountability and report the emergency event to the RWMC shift supervisor as described above. Eating, drinking, and smoking are not permitted during emergency evacuations. Radiological Control personnel will assist and direct all workers exiting from radiological contamination areas during a local area evacuation alarm.

10.7 Evacuation Assembly Areas and Central Facilities Area Medical Facility

The RWMC maintains primary and secondary evacuation routes and assembly areas. These routes may be used in response to a total facility evacuation as directed by the RWMC emergency coordinator. Copies of the following figures will be available in the project operations area. Figure 10-1 shows the RWMC evacuation and assembly areas and Figure 10-2 contains a map showing the location of CFA-1612 medical facility.

In the event that the project operational area is evacuated, personnel shall assemble in the designated assembly area, or as directed by the OU 7-10 shift supervisor (local area evacuation) or RWMC emergency coordinator. If a total area evacuation of the RWMC is ordered, then project personnel shall relocate to the RWMC primary evacuation assembly area (see Figure 10-1) or as directed by the emergency coordinator.

10.8 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 8.2. Decontamination of personnel and equipment is described in Section 11.2.

10.9 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general Site security and control requirements identified in Section 7 unless conducted as part of an emergency response action. All entries into OU 7-10 Project operational areas performed in support of emergency actions will be controlled by the on-scene commander.

10.9.1 Reentry

During an emergency response it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions of operational equipment or processes
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken on a graded approach and will be based on the nature of the initiating event, hazards to personnel and structures, and purpose for the reentry.

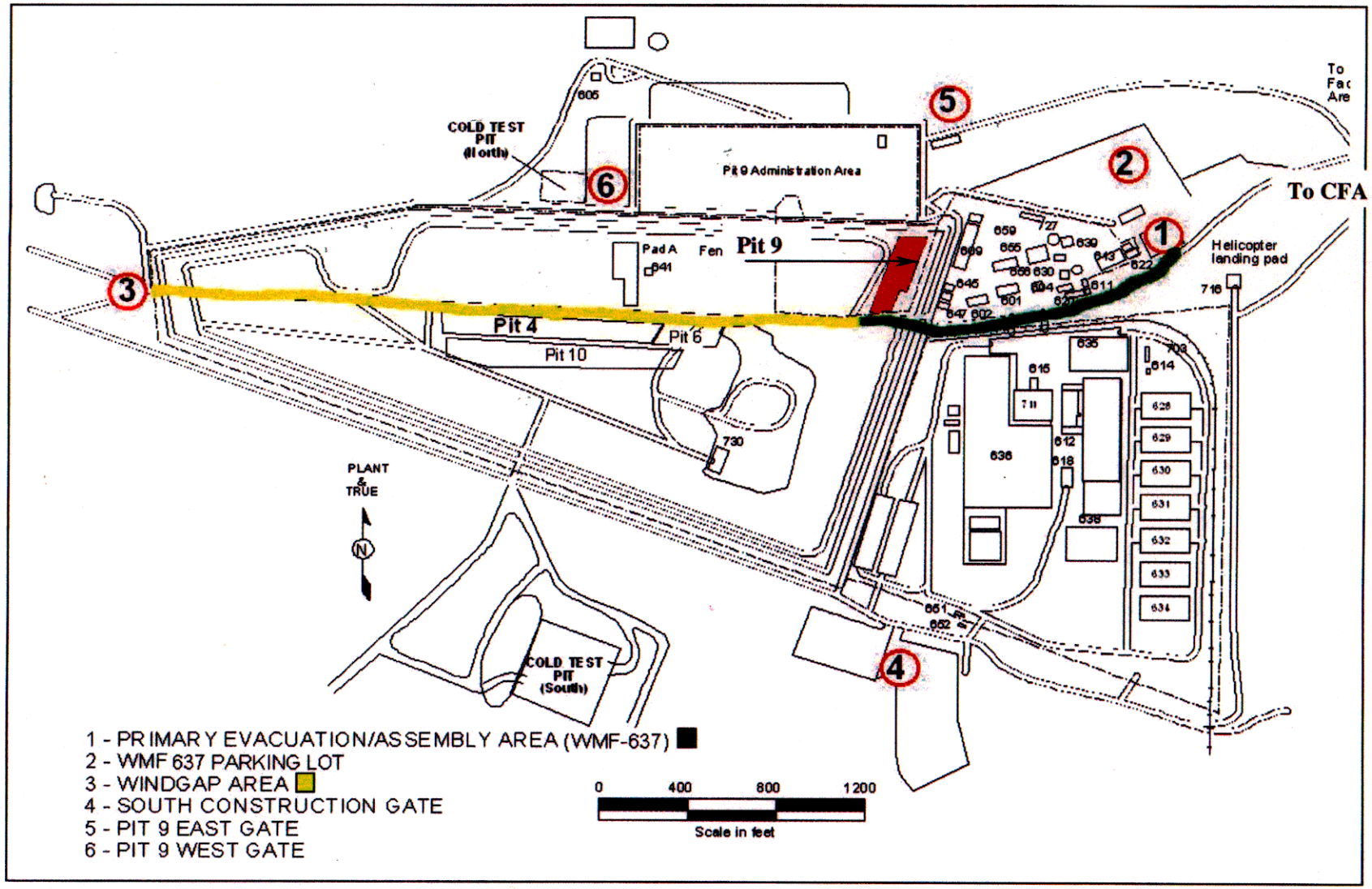


Figure 10-1. Evacuation and assembly areas at the Radioactive Waste Management Complex.

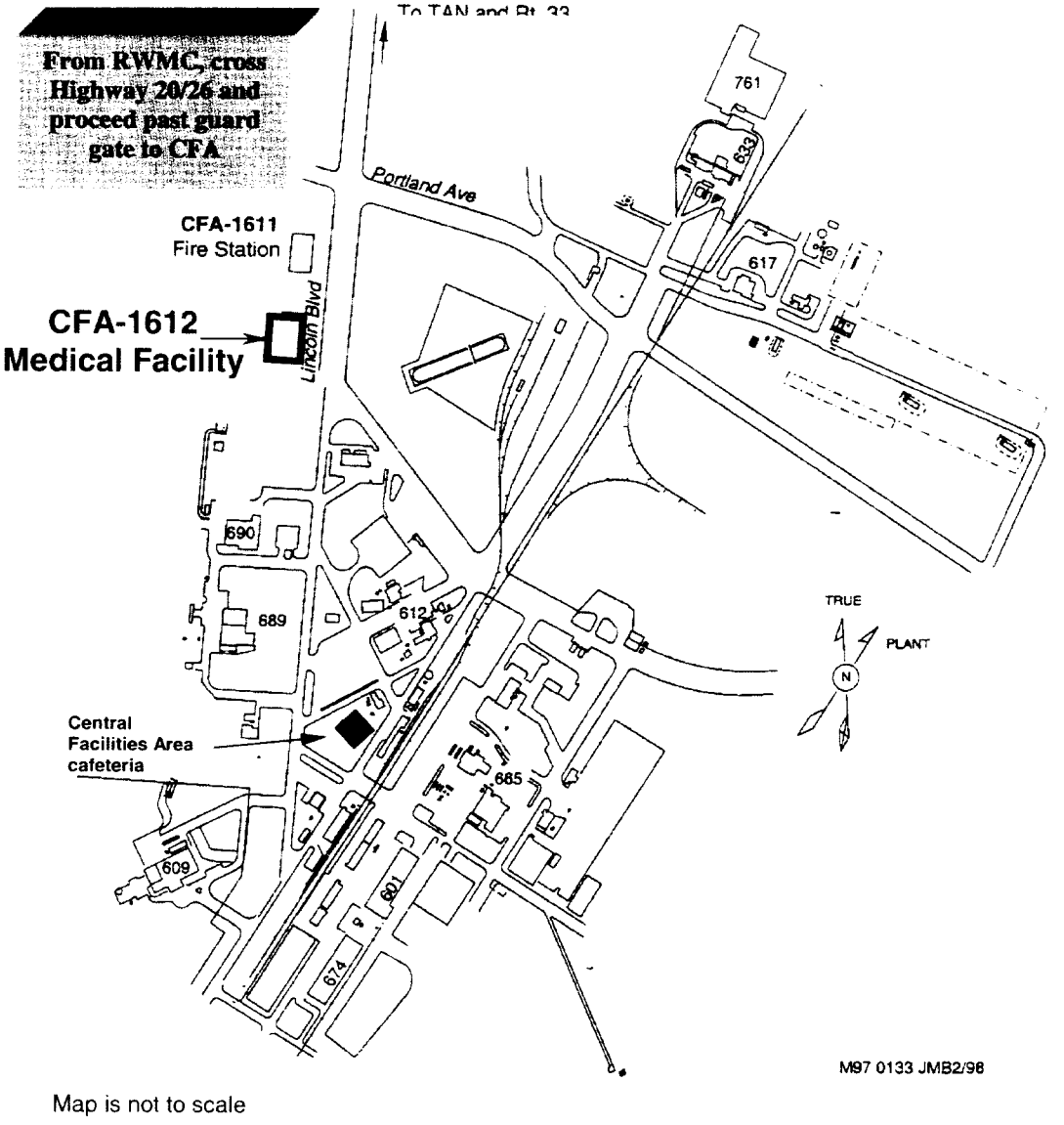


Figure 10-2. Map showing the route to the nearest medical facility (Central Facilities Area-1612).

10.9.2 Recovery

After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of (1) assessing post-event and post-emergency conditions, (2) developing a plan for returning to preevent and preemergency operating conditions, when possible, and (3) following the plan to completion. The RWMC emergency coordinator, in consultation with the project NFM, operations manager, and RWMC operations director are responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The project NFM, with concurrence from the operations manager and in consultation with the RWMC operations director, will appoint the recovery manager.

Where a restart of OU 7-10 Project operations is required following a shutdown, all operational restart requirements of MCP-2783, "Startup and Restart of Nuclear Facilities," will be followed.

10.10 Critique of Response and Follow-up

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation may be required before commencing recovery actions. For this reason care should be exercised to preserve evidence when appropriate. The OU 7-10 Project NFM or operations manager will lead all critiques of OU 7-10 Project operational events requiring a critique in accordance with PLN-114.

10.11 Telephone and Radio Contact Reference List

Table 10-3 lists the points of contact for the OU 7-10 Project operations. A copy of this list or similar list with key operational contacts will be posted at the OU 7-10 Project shift desk at all times. Because personnel listed may change frequently, working copies will be generated as required to note new positions and changes of personnel assigned. This HASP should not be revised with a document action request to note these changes.

Table 10-3. Operable Unit 7-10 Project emergency contact list.

Contact Title	Contact Name	Phone Number/ Radio Net	Pager Number
Warning Communications Center, medical, fire, security	NA	777, 6-1515	NA
First aid (CFA medical dispensary, CFA-1612)	NA	6-2356	NA
Occupational Medical Program	NA	6-1596	NA
OU 7-10 Project operations and nuclear facility manager	M. Dicken	6-1085	5076
OU 7-10 Project manager	M. Pratt	6-5565	3237
OU 7-10 Project shift operations manager	J. Barker	6-3432	7667
OU 7-10 Project industrial hygienist	B. Perkes	6-9358	6355
OU 7-10 Project safety professional	K. Wooley	6-4731	7368
OU 7-10 Project radiological engineer	R. Horne	6-5318	5898
RWMC operations director	D. Bright	6-4223	5270
RWMC shift desk	Shift supervisor	6-2767 or RWMC trunked radio	
RWMC nuclear facility manager	A. Millhouse	6-6932	5304
RWMC Radiological Control office	Foreman	6-2710	
RWMC Completion Project director	J. Schaffer	6-3029	6451
OU 7-10 Project DOE-ID representative	J. Snook	6-5920	NA

CFA = Central Facilities Area
DOE-ID = U.S. Department of Energy Idaho Operations Office
NA = not applicable
OU = operable unit
RWMC = Radioactive Waste Management Complex

11. DECONTAMINATION PROCEDURES

The OU 7-10 Project operations will involve decontamination of the PGS, excavator, equipment, RCS building surfaces, exterior waste containers, other operationally contaminated items requiring decontamination, and potentially some degree of personnel decontamination. Every effort will be made to prevent contamination of OU 7-10 Project personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. Where contact with potentially contaminated surfaces or entry into known contaminated areas is anticipated, additional radiological monitoring as described in Section 3 in combination with use of PPE will be necessary to control the hazard. This section provides guidance on how decontamination will be performed.

The OU 7-10 Project facility engineering design features (confinements) in conjunction with contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. Where decontamination is required, decontamination procedures will be used. Management Control Procedure-148, "Personnel Decontamination," contains information on personnel radionuclide decontamination. Radionuclide decontamination operations required for equipment or areas will be performed in accordance with Chapter 4 of companywide *Manual 15A* (PRD-183), in accordance with the "OU 7-10 Glovebox Excavator Method Project Facility Shutdown Plan and D&D&D Pre-Plan" (PLN-343), and at the direction of RadCon personnel

11.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize OU 7-10 Project operations personnel contact with contaminated surfaces that will be encountered during project operations. The use of engineering controls, protective barriers, protective clothing, modified work control practices, or addition of hold points and surveys will all be used to minimize direct contact with contaminated surfaces. The following contamination control and prevention measures will be employed:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants (where feasible)
- Preplan all operational activities where contact with contamination is anticipated and conduct dry runs to validate operating procedures or maintenance activities as deemed appropriate
- Sleeve or place a disposable barrier between equipment and tools and the contaminated surface or environment (where feasible)
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated

- Implement immediate decontamination procedures to prevent the spread of contamination where contamination is found on the outer surfaces of equipment or grossly contaminated clothing during operational activities (including decontamination tasks)

- Use only the established radiological entry and exit control points when accessing contaminated areas to minimize the potential for cross-contamination and expedite contamination control surveys.

11.2 Equipment and Personnel Decontamination

The OU 7-10 Project operational decontamination procedures will be used for routine decontamination of the PGS and other areas where contamination is anticipated (waste handling and packaging areas) to prevent the spread of contamination and to meet OU 7-10 Project operational requirements. In addition, decontamination is necessary to control contamination and protect areas outside the RCS and PGS confinements to maintain a clean working area within the WMF-671 WES. Both radiological and nonradiological contamination will be evaluated when decontaminating surfaces.

Radionuclide decontamination operations for equipment or areas will be performed in accordance with Chapter 4 of the RCM and at the direction of RadCon personnel. Nonradionuclide decontamination will be conducted in accordance with established project procedures or on a case-by-case basis under the direction of Industrial Hygiene personnel to determine the most appropriate PPE. In all cases, the collection, storage, and disposal of decontamination waste will be addressed before the generation of such waste and stored as described in Section 11.5. Protective clothing and respiratory protection selected for decontamination tasks will be based on the contaminant being decontaminated and as described in Section 5.

11.2.1 Equipment Decontamination

The OU 7-10 Project facility engineered isolation controls have been established, where feasible, to prevent contamination of project equipment and facilities from known or suspected sources of contamination. These controls will serve to isolate and eliminate or mitigate many of the potential contamination pathways to prevent equipment contamination and greatly reduce the need for decontamination.

When conducted, equipment decontamination will be performed in accordance with established project decontamination procedures. Low-cost consumable items will be discarded if initial decontamination efforts fail or extensive decontamination is required that is not in accordance with ALARA principles.

Decontamination of the OU 7-10 Project RCS and PGS will be conducted in accordance with the *OU 7-10 Glovebox Excavator Method Project Facility Shutdown Plan and D&D&D Pre-Plan* (PLN-343).

11.2.2 Personnel Decontamination

Engineering controls, in conjunction with facility contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. The PPE selection, as identified in the RWP and JSA, will provide for the layered barriers required to prevent permeation and minimize external surface contamination.

Instructions for donning and doffing radiological protective clothing will be posted at the entry and exit control points to all contamination areas in accordance with PRD-183. Before donning PPE, all items will be inspected following the list in Table 9-2. One of the greatest potentials for personnel contamination exists from improper doffing of contaminated PPE when exiting a contamination area. All operations personnel who enter radiological contamination areas will doff PPE following the posted instructions. If questions or problems arise while doffing (such as tearing protective clothing), guidance and assistance on how to proceed should be requested from the assigned RCT.

11.2.3 Decontamination in Medical Emergencies

Injured or ill personnel should be immediately evaluated by first-aid-trained personnel (within their level of training and on a voluntary basis) within the project operations area where the incident occurred. The shift supervisor will contact the RWMC shift supervisor or the WCC (if the RWMC shift supervisor cannot be reached) to summon emergency services.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), potentially contaminated areas of the individual will be wrapped in plastic, blankets, or available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The IH or RCT (depending on the type of contamination) shall accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE then will be removed at the CFA medical facility (CFA-1612) and carefully handled to prevent the spread of contamination. Information on proper handling of radionuclide-contaminated wounds is contained in MCP-148, "Personnel Decontamination."

11.3 Doffing Personal Protective Equipment and Decontamination

Personnel decontamination will likely be limited to doffing of PPE. However, some preliminary surface decontamination of protective clothing may be required if it is grossly contaminated and the potential for the generation of airborne radioactivity or organic vapor emissions exists. This will involve assistance from other personnel inside the contamination area and at the doffing location as described below. The ultimate goal of all decontamination methods is to effectively and efficiently isolate the source of contamination through removal of protective clothing and confinement of the contamination in a sealed bag or waste container.

If contamination is detected on outer PPE layers, careful removal of these outer PPE layers will generally isolate over 99% of surface contamination and this will serve as the primary decontamination method if protective clothing is contaminated. Removal of contaminated protective clothing using standard radiological doffing techniques (i.e., rolling outer surfaces inward and from top to bottom while being removed) provides the most effective method for containing and isolating the contaminants and greatly reduces the potential for exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing and brushing).

Where protective clothing also is worn as an anti-contamination layer, then tape, gloves, booties, and any required dosimetry will be removed following the posted doffing sequence. All PPE will be placed in the appropriately labeled waste containers. Doffing and any required decontamination will take place at the designated contamination area boundary or step-off pad. If exiting a radiological

contamination area, personnel will conduct the proper personal survey with hand-held detectors followed by an automated whole-body survey in a PCM (or equivalent), as stated in the RWP.

A general approach for doffing modified Level-D, -C or -B PPE is described in Sections 11.3.1–11.3.3. However, no single doffing strategy works for all circumstances. Modifications to this approach are appropriate if operational conditions change or at the discretion of the RCT in consultation with the IH. Both radiological and nonradiological hazards will be evaluated, as applicable.

11.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination

Modified Level D protective clothing (e.g., Tyvek coveralls and booties) will be doffed following standard radiological removal techniques (as posted) and will constitute the initial decontamination step. If the protective clothing also is being worn as an anticontamination layer, then tape, gloves, booties, and any required dosimetry will be removed following the posted doffing sequence. All PPE will be placed in the appropriately labeled waste container(s) for disposal. Doffing and any required decontamination will take place at the boundary between the contaminated area and the step-off pad. Doffing will be followed by conducting a personal contamination survey, as stated in the RWP.

Note: Under some radiological conditions, two sets of anticontamination clothing may be worn. When required, the posted instructions will address the proper doffing sequence for both sets.

11.3.2 Level C Personal Protective Equipment Doffing and Decontamination

Where respiratory protection is worn in conjunction with protective clothing (Level C PPE), the modified Level D sequence will be followed with one additional step. Following protective-clothing doffing, respirators will be removed and placed in a separate container. A survey of the face and sealing surfaces of the respirator then will be performed by the RCT or as part of the posted survey instructions by the respirator wearer. Doffing and any required decontamination will take place at the designated radiological control boundary as described above. If exiting a radiological contamination area, personnel will conduct the proper personal survey, as stated in the RWP.

11.3.3 Level B Personal Protective Equipment Doffing and Decontamination

The distinction between Level C and B PPE will be the addition of supplied air respiratory protection. Respiratory protection may be in the form of a bubble hood or airline respirator (with escape canister or cartridge where required). The doffing sequence when using a supplied airline is slightly more complicated than Level C respiratory protection and all operations personnel who will enter an area with Level B PPE must have a clear understanding of the doffing sequence before entering the area. It will be necessary to disconnect and tape over the supplied airline before exiting the contamination area. The RCT will assist personnel exiting these areas and doffing instructions will be posted and must be followed. Doffing and any required decontamination will take place at the designated radiological control boundary as described above. If exiting a radiological contamination area, personnel will conduct the proper personal survey, as stated in the RWP.

11.4 Personnel Radiological Contamination Monitoring

Radiological surveys (with hand-held detectors and an automated whole-body PCM) will be required before personnel exit project operational areas as stated on the RWP. The purpose of this hand-held instrument survey is to detect surface contamination. If survey instruments or the PCM alarms indicate elevated contamination levels are present, personnel should remain in the area and contact (or have someone in a nonradiologically controlled area) contact RadCon. When exiting a contamination area

or contamination radiological buffer area, an automated whole-body survey using a PCM station (or equivalent) must be conducted before using designated eating or smoking areas.

11.5 Storage and Disposal of Operational Waste Materials

Waste generated from decontamination and other project operational activities will be properly characterized, stored, and disposed of in accordance with the following documents:

- *Waste Management Plan* (Manual 17, 2003)
- *Waste Management Plan for the OU 7-10 Glovebox Excavator Method Project* (INEEL 2003)
- Established project procedures
- Waste-disposal and disposition forms.

11.6 Project Sanitation and Waste Minimization

Project personnel will use washroom and restroom facilities located within the project operational areas and the RWMC area. Potable water and soap are available within the project operations areas for personnel to wash their hands and faces.

Industrial waste materials will not be allowed to accumulate at the project operational areas. Appropriate containers for industrial waste will be maintained within the project operational areas. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All project operations personnel are expected to make good housekeeping a priority.

12. RECORDKEEPING REQUIREMENTS

12.1 Industrial Hygiene and Radiological Monitoring Records

The IH assigned to the OU 7-10 Glovebox Excavator Method Project will record airborne monitoring and sampling data (both area and personal) collected for project operational exposure assessments in the INEEL Hazards Assessment and Sampling System Database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and the manufacturer specifications. Industrial hygiene airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the IH in accordance with INEEL safety and health manual procedures (Manual 14A, 2003; Manual 14B, 2003).

The assigned RCTs will maintain a logbook of radiological monitoring, daily project operational activities, and instrument calibrations where instruments were used to document detection levels or conduct field screening of samples. Radiological monitoring records will be maintained in accordance with companywide *Radiation Protection Procedures* (Manual 15B, 2003); PRD-183; and MCP-9, "Maintaining the Radiological Control Logbook."

All other health, safety, and radiological records, including inspections, will be maintained in accordance with appropriate and applicable requirements identified in companywide *Safety and Health—Occupational Safety and Fire Protection* (Manual 14A, 2003), *15A* (PRD-183), *Radiation Protection Procedures* (Manual 15B, 2003), and *Radiological Control Procedures* (Manual 15C, 2003), and applicable RWMC and project supplements.

12.2 Records Management

The Environmental Restoration Administrative Record and Document Control (ARDC) office organizes and maintains data and reports generated by field activities. The ARDC office maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of project plans, this HASP, the quality program plan, the Quality Assurance Project Plan (QAPjP) (DOE-ID 2000), and other documents pertaining to these operations are maintained in the project file by the Environmental Restoration ARDC office. Controlled procedures for the RWMC and OU 7-10 Project will be issued, controlled, and maintained in accordance with MCP-135, "Creating, Modifying, and Canceling Procedures and Other DMCS-Controlled Documents," and applicable RWMC or project supplemental MCPs.

All additional project records will be maintained in accordance with applicable federal and state procedures, companywide manuals, and project-specific supplemental procedures.

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